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# CATALOGUE



OF

## ELECTRICAL APPARATUS

INSULATED WIRE, CONDUCTING CORD,

AND

ACCESSORIES,

MANUFACTURED AND FOR SALE BY

Dr. JAMES GLASS,

WITH INSTRUCTIONS FOR THE USE OF

HIS ELECTRO-MAGNETIC MACHINES,

*And Suggestions for the Treatment of Disease with the  
Medical Batteries Manufactured by the*

EXCELSIOR GALVANO-ELECTRIC WORKS,

No. 1210 FILBERT STREET,

PHILADELPHIA;

SOUTHERN BRANCH, 175 NORTH BROAD ST., ATLANTA, GEORGIA.

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THE UNIVERSITY OF CHICAGO



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PHYSICAL SCIENCES

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ELECTRICITY  
AND  
ITS RELATION TO LIFE.

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A LECTURE

BY

PROF. G. DOUGLASS COLEMAN.



LECTURE  
ELECTRICITY  
AND  
ITS RELATION TO LIFE

A LECTURE  
BY  
DR. J. H. COOPER  
OF THE  
UNIVERSITY OF CHICAGO  
CHICAGO  
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1892



# ELECTRICITY

AND

## ITS RELATION TO LIFE.

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Electricity is an element rapidly coming into use, is attracting the studious attention of many, yet, despite the discoveries of the last two hundred years, we to-day, know comparatively little about it.

Over twenty-four hundred years ago, Thales, a Grecian philosopher and moralist, discovered that pieces of amber when rubbed with a dry cloth attracted pith and light bodies. For twenty-two hundred years the electrical knowledge of the world contented itself with this discovery, until in 1600, Dr. Gilbert, physician to Queen Elizabeth, published a work upon magnetism, and first used the word electricity.

He showed that sulphur, wax, glass, and other bodies showed the phenomena of electrical disturbance. He announced the first theory of terrestrial magnetism, and first used the term poles. The word magnetism is derived from Magnesia, in Asia Minor, from where the first natural magnets (loadstones) were brought. In 1729 Stephen Gray discovered electric conduction and non-conduction, or the difference between conductors and insulators. In 1745 Bishop Von Kleist made the first form of Leyden jar, and in 1746 Cuneus, Allamand, and Musschenbrock made experiments with the jar that resulted in the latter receiving a shock so severe that he declared the Crown of France would not be a temptation for him to receive another. Franklin gave the theory of the Leyden jar in 1747, and, continuing his researches, established the identity of the lightning flash to the electric spark by his celebrated kite experiment June 15th, 1752. The following year, Professor Richman, of St. Petersburg, in repeating the experiment, met with his death, and his companion was rendered senseless.

In 1791 Galvani made his experiments, which first linked electricity and animal life together, and in 1800 Volta constructed the pile bearing his name, and gave the world the idea that chemical



action upon elements was productive of the electric current, until to-day we know that every chemical change, either produces or absorbs electricity, and the wider the difference between the molecular polarity of the elements, the greater the result.

In 1819 Oersted, a Danish savant, discovered that a magnetic needle when suspended and pointing to the north would, when a wire in which a galvanic current was flowing was placed above it, immediately places itself at right angles to the wire. In 1820 Arago and Sir Humphrey Davy each independently discovered electro-magnetism. In 1830 Faraday discovered that currents of electricity could be generated by induction, by placing an insulated coil within the magnetic field of an electro-magnetic or galvano-magnetic helix.

In 1850 Ruhmkorff constructed the coil named after him, and the French Government granted him a pension.

The first Ruhmkorff coil manufactured in Philadelphia was made by Dr. J. Glass, now manufacturing batteries and practicing electro-pathy at No. 1210 Filbert Street.

Professor Henry, of Smithsonian Institute, and Professor Riess, of Berlin, simultaneously discovered, about 1855, that induction was indefinite.

The later discoveries, by which electro-magnetism gave us the telegraph, and the reciprocal action of electro-magnetism back into magneto-electricity gave us the telephone, are quite well known, and need not be detailed; suffice it to say, that we still know but little of electricity, and any one who would in the name of Science suggest the idea that we had arrived at any degree of fullness of knowledge upon the subject would be entirely unwarranted and unauthorized. We have but discovered enough to teach us how much more there is to know, and how little we have advanced in that knowledge. What is electricity? Professor Thompson, after a series of experiments to answer this question, has but a theory to advance; still, as it is an hypothesis based upon the developed facts, it is the best we can do.

He says either electricity is ether, or ether is the medium through which electricity manifests itself.

What is ether? I would like to continue on in the line in which the subject leads, but must defer that for the present, as I wish to draw attention to the subject of Electro-Physiology.

In this I do not put forward any claim to originality, I only claim that the accepted theories of the schools, especially those of medicine, have with a conservative bigotry endeavored to ignore the discoveries of the past fifty years, and where they could not influence those who attempted to depart from the practices of their predecessors, they have intolerantly ostracized and tabooed them.

And this is not much to be wondered at, as Electro-Physiology is as much an innovation as was Harvey's theory of the circulation of the blood.

The Copernican theory of the universe, now a proven fact, simply stated the position and motion of the planets and stellar worlds,



leaving out the nature of the forces propelling and attracting, beyond, indeed, the statement of attraction and centrifugal force, which was only giving a *name* to the manifestations of the forces operating.

What I would assert is, that electricity and magnetism are the propelling and conserving forces of nature, from the star-drift of systems, to the circulation of the planets, and so on down to the maintenance of life in animal and vegetable forms, even to the polarity of the crystals in the mineral forms, giving them their distinctive character.

And this assertion I will not ask to be received as a bare unsupported statement, but will adduce a few of the multitude of facts going to prove this hypothesis, as a totality, which in regard to vegetable and animal life can be asserted, not to be an hypothesis, but an observed fact. I will but refer in a general way to all but the facts relating to the physiological part of the matter, as it is to that I would wish to draw attention, as to attempt to speak of it all would be impossible in one lecture.

First the earth is a great magnet, an assertion unquestioned and of indubitable proof. See the able pamphlet of Professor Mayer, *The Earth a Great Magnet*.

Of magnetism and its laws I have now no time to speak, as Oersted in 1819 discovered the fact that the magnetic needle placed itself at right angles to a current, so we find the earth's poles at right angles to the plane of the elliptic, with a variation or nutation or nodding of the poles, in accordance with the variation of some great current across which we run. Venus and Mars show the same phenomena. The equatorial and temperate zone currents act as a monster helix to magnetize the body of the earth, giving us the two poles. Humboldt showed the relation between the electric storms in the sun upon the electrical condition of our earth, the aurora borealis, earthquakes, storms, and the fact that the magnetic pole revolves around the geographical pole and that at only a few points in a certain line (which line is not a true north and south line) does the magnetic needle point to the true north, and even on this line subject to a daily variation, according as the sun, or the inclination of the earth to the sun, is varied by the season. In 1557 the compass pointed due north at London; in 1576 there was a variation of  $11^{\circ} 15'$  east; and in 1760 a variation  $19^{\circ} 30'$  west; in 1873,  $19^{\circ} 30'$  west; the same year Wilmington, North Carolina, and Cleveland, Ohio, were in the line of no variation. This variation in the magnetism of the earth seems to follow the inductive power of some great current of which we are at present ignorant.

The Japanese discovered, over two centuries ago, that the approach of an earthquake was readily foretold by the electrical disturbances that preceded and accompanied it, and had magnets with pieces of steel attached suspended over bells in their houses. When an earthquake shock was about to take place, the magnet



lost its power, the steel fell, and the bell was rung. The "ground currents" foretell the coming storm both in the air and in the violent shock in the earth.

Again, earthquakes are common in countries of no rain, witness the west coast of South America and California in the dry season. Again, in countries of long dry seasons, the building of railroads, making a continuous electric line of conduction over the surface, and also a great surface both for electric condensation and radiation, has a most marked effect upon the rainfall. Much more might be adduced, as that of storms following water-courses, lines of low ground, and so on indefinitely, but time forbids; besides, in this, it seems the only rational explanation of the facts, all others are vague and subjects of faith rather than reason.

In the elemental world we find oxygen at the negative end, and caesium at the positive end. All the minerals are, from some crystalline law of polarity, comparatively positive and negative to one another in degree.

<b>NEGATIVE.</b>		
Oxygen,	Palladium,	Carbon,
Sulphur,	Mercury,	Antimony,
Nitrogen,	Silver,	Tellurium,
Fluorine,	Copper,	Tantalum,
Chlorine,	Uranium,	Columbium,
Bromine,	Bismuth,	Titanium,
Iodine,	Zinc,	Tin,
Selenium,	Manganese,	Indium
Phosphorus,	Lanthanum,	Lead,
Arsenic,	Didymium,	Cadmium,
Chromium,	Cerium,	Thallium,
Vanadium,	Thorium,	Cobalt,
Molybdenum,	Zirconium,	Nickel,
Silicon,	Aluminum,	Iron,
Hydrogen,	Erbium,	Barium,
Gold,	Yttrium,	Lithium,
Osmium,	Glucinum,	Sodium,
Iridium,	Magnesium,	Potassium,
Platinum,	Calcium,	Rubidium,
Rhodium,	Stronchium,	Cæsium,
Ruthenium,	Tungsten,	<b>POSITIVE.</b>
	Boron,	

Thus sulphur is positive to oxygen, although negative to all the other elements, and so on. The principal acid-making elements are in the negative end of the line, the alkaline in the positive, and a careful study of their relation suggests an idea that our idea of the original elements being molecularly different may yet be proved to be but apparent, the truth being that the difference is due to the permanent crystalline polarity of the molecules. There is no posi-



tive reason which can be given for this view; I only throw it out as a suggestion—"food for thought."

In the vegetable world we have had no experiments made to show whether electricity circulates from root to leaf or not, but if we will with a microscope examine the circulation of the sap, and see how it is allied to the circulation of the blood, we must look to something else than that scape-goat, capillary attraction, for an explanation; besides, we *know* that plants are conductors of electricity when alive, that electricity stimulates and invigorates their growth, that the electric light is a substitute for sunlight, and that the germination of the seed is accelerated and more assured when a current of electricity passes through them. The London *Daily News* gave an account where Dr. Siemens brought a pot of tulips into bloom in some three quarters of an hour by the use of electricity. In the animal world, from the experiments of Galvani on to 1827, when M. Nobili discovered the existence of the electric current in the frog (the needle in the galvanometer deflecting thirty degrees), on to Matteucci and DuBois Reymond (the German philosopher), who discovered the same currents were to be found in all animals, both warm and cold-blooded, and then extending over several years, including observations upon man, resulted in the following:

1st. Electrical currents were to be found in all animals.

2d. That the muscles as well as the nerves possessed them.

3d. That the current was muscular, the nerves acting as conductors.

4th. That these muscular currents were both up and down; that the current of a whole limb was the resultant of the local currents of the muscles of that limb.

5th. That these currents do not depend upon any voltaic relation of the nerves, muscles, and tendons.

6th. That all the tissues of the body were conductive, except the fascia and neura, or sheaths of the nerves, these latter acting as insulators.

7th. That this animal electricity was capable of decomposing iodide of potassium and deflecting the needle of the galvanometer.

8th. That the current in the nerves and muscles was in the condition of a "closed circuit."

9th. That every contraction of a muscle was accompanied by an electrical discharge. It has been found, and can readily be proved, that the skin is a non-conductor, acting as an insulating membrane to retain the electricity. All non-conductors, so-called, are of course but partially so, conduction and non-conduction being but comparative. Still, outer or extra and sub-cutaneous currents were proved to exist. It has also been demonstrated that the extremities are negative to the trunk, and that different temperatures at different parts of the body change their polarities. In 1872 Professor John Towbridge, of Harvard College, attempted to disprove the statements of Matteucci and Du Bois Reymond, but instead of using actual nerve and muscle, he used what he called "artificial



muscles," made of "glass tubes covered by porous partitions and filled with different liquids."

How such experiments were to invalidate those of Du Bois Reymond and what can be proved daily (Professor Towbridge to the contrary notwithstanding) remains to be proved. That Professor Towbridge was successful as a manufacturer of flesh, blood, and tissue in any other than the ordinary and natural way is a matter of extreme doubt.

I have myself ignited gas by sparks drawn from my fingers and shook showers of sparks from woolen underclothing taken off in the dark; have seen pain removed by the currents from the unaided hands of a strong, healthy, and positive person upon a weak and negative—we all know the effect when two such persons sleep on the same bed—and so on indefinitely.

It is beyond question, and is slowly and unavoidably being admitted by the conservative faculties of the medical colleges of the United States, that electricity circulates in all the actions, of all the muscles and organs of the body. (One college in Philadelphia is beginning to teach something of it, and fifty years from now, unless forced to acknowledge it sooner, they will probably begin to teach what is now a subject of daily proof to those who are inclined to investigate.) Galvanic currents seem to be the ones flowing in conjunction with all those organs and functions where chemical changes are most active, as in circulation, digestion, secretion, and the building up and the disposition of the torn-down elements, and induced currents relating to motion and sense. This would also seem natural, as the galvanic current is the current of chemical change, having volume instead of tension and more pronounced polarity, while induced currents, having tension rather than volume, act upon the muscular fibre as contractors, and are dynamic rather than chemical.

It is a fact in physiology that acids diminish the irritability of nerves, while alkalies increase it. In electrolysis, acids go to the positive pole and alkalies to the negative. Sir Humphrey Davy experimented long ago on this. With distilled water in the bath connected with the negative pole alkalies were excreted from his body and deposited in the water; when the positive pole was connected with the bath, phosphoric acid, sulphuric acid, uric acid, and hydrochloric acid were excreted and deposited in the water.

Why with this fact in physiology, and this fact in electrolysis before their minds, proved long ago by so eminent a scientist as Sir Humphrey Davy, and by the daily electropathic practice, to be so applicable to the human body, the medical, so-called scientific world can shut their eyes and fail to see, is simply because they do not want to, because many such admissions would break up the drug trade, and mainly because the accepted theories and dogmas of drug medication are so firmly fixed in their minds that they cannot



conceive of the possibility of aught else, it being to them the embalmed truth of the ages.

M. Poey in 1855 presented a paper to the French Academy where he cited numerous cases of the extraction of metals from the human system by electrolysis, one case being the extraction of mercury from the bones of a man to whom it had given trouble for fifteen years. An electro-plater (1852, New York) had a dangerous ulcer on his hand caused by immersing his hand in solutions of cyanure of gold and silver. Drug medication and external application utterly failed, but by electrolysis in fifteen minutes the metal plate at the negative pole was covered with a thin film of gold and silver, and a few more applications cured the ulcer.

Nor is electricity confined in its physiological action to the extraction of acids, alkalies, and mineral bases. If this *were* all, it would be enough to make it of great value. Much more than is admitted by the medical fraternity.

Right here let me say that in these general strictures upon the medical fraternity I do not include all. There are notable exceptions, and these exceptions are to be found rarely in the pettifoggish branch, but among those who are considered "shining lights" in their profession. These, while not admitting the general utility of the intelligent use of electricity, still use it as a convenience when drug medication fails; their main faith still rests with the old dogma. Dr. Francis E. Anstie, of London, is quoted by ex-Surgeon General William A. Hammond as saying: "I am now fully able to speak with far greater assurance of the *positive value* of electricity as a remedy for neuralgic pain. I shall make bold to say that nothing but the general ignorance of facts can account for the extraordinary supineness of the mass of English practitioners with regard to this question." To which Dr. Hammond added: "This is true of America. Many of our physicians know almost nothing of the *great benefits to be gained by this agent*, and have groundless scepticism of all that is said in its favor." This class of physicians, whose reputation is beyond the reach of envious detractors, and whose general intelligence and information enable them to know, dare take the liberty to speak of this proscribed agent.

Conversing daily with the medical men and women of our city upon this subject, I think I can judge somewhat of their feelings. To illustrate: Not so very long ago a physician, who was at that time a professor in one of the Philadelphia colleges, desired to rent a battery. "Why, Doctor, don't you *buy* one? You are not short of cash." "I want to treat myself," he replied, "and I want to be able to stand up before my class and declare that I never owned a battery." Comment is unnecessary.

Again, another was solicited to buy a battery who was at that time a professor in a college of another sect or pathy. His professorship terminated in one month. This, coupled with the fact that he promised to buy at that time, led the question to be asked, when the



promise was fulfilled, why he did not buy at first. The answer was, "Well, I want to treat my wife, and if I had have had a battery around my office while students were coming in occasionally, they might have seen it, and it might have made me some trouble," or, in other words, the intolerance of his school would have resulted in detraction and injury to his practice. The names and dates of these instances could be given if necessary. I might go further and quote from the ethics of the different pathies and prove a state of bigotry and intolerance among them greater than exists in the theological world, and quote numerous special instances, but I will dwell no further upon it, as it is slowly becoming less severe. Still, there is little cause to hope for its extinction for years to come.

Again, many doctors who use electricity in their practice do not do so from a conviction based upon electro-physiology, but as they would any ordinary drug. They find it marked in its control over neuralgia, and set it down against that complaint, or they are utterly unable to deal with some chronic disorders, and by experiment, as a last resort, or to get the case off their hands, turn it over upon the common pack-horse of all the pathies, electropathy.

Their treatment of electricity is about as intelligent as that of the country doctor who gave a prescription to a sick blacksmith who recovered, and when prescribed for a cobbler, who died, he wrote a memorandum against the prescription, "Good for blacksmiths but death on cobblers."

A physician may be qualified in anatomy, physiology, pathology, obstetrics, and the particular materia medica of his sect, but know nothing of electro-physics, regard electro-physiology as nonsense, and deny electro-therapeutics. How can such competently apply electricity? Upon the other hand, because a sign hangs upon the door, Medical Electrician, or Electropathic Physician, is not a qualification, or is even a knowledge of electro-physics, without some general knowledge of anatomy and physiology, a qualification as a competent Medical Electrician.\*

Again, electropathy is practiced by parties in Philadelphia, who advertise extensively, and refer, first to their landlord, whom they never treated; second, to a couple of lawyers, who are their employees to help them out of their scrapes upon their agreements to cure; to people whom they have swindled and who have repeatedly ordered them not to use their names, and to quite a number who have been dead for spaces varying from two to ten years. I thought it but fair to show up all sides, and so you see I have not dealt leniently

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\*An electropathic physician, who has been treating with a magneto-electric machine, containing, of course, no galvanism, bought an electro-magnetic battery, and the next day sent word that it would not work. On calling at her office it was discovered that the rheotome not starting to vibrate itself, she knew so little of electro-physics that instead of starting it with her finger, she concluded the battery was out of order. This party also could not locate any of the principal organs of the human body.



with the electrical humbugs any more than the regular graduated bigots. But I have wandered somewhat from the line I started out upon, and therefore let us return to the original line of thought. Wherein does electro-physiology differ from physiology? Broadly, in no wise does it differ; it comes as additional light, and clears up many cloudy and dark corners. It is simply true science upon the subject up to date, altering and correcting previous errors.

Those who as physiologists to-day deny electro-physiology, do it upon the basis of ignorance, an ignorance due to a bigotry which blinds them to the facts. Suppose, for instance, the discovery of the circulation of the blood, which fact upset many of the accepted physiological theories then prevailing, had been ignored for fifty years; a physiologist who would teach and ignore Harvey's demonstration at such a time would stand in just the same position as they generally do to-day upon the question of electricity, and electricity holds the same position to physiology as Harvey's discovery did then.

To show you the position of the average medical man I will relate what occurred a few days ago. Calling upon an M. D. regarding electricity and batteries, I was most ungraciously received, but, determined to get his views, I quoted Anstie as quoted by ex-Surgeon General Hammond, and the latter's views. "Oh! Hammond is an old man in his second childhood." I then referred to Thomas. "He's a homœopath; don't expect any better from him." I then mentioned Morton. "Yes, visiting physician to the insane asylum; he must have caught his ideas there." I then mentioned Blackwood, Goodman, Gross, Pancoast, Hornor, and others who were far above him in standing in the profession, to which he angrily replied, "Yes, I admit they are regulars, but they have adopted the methods of quacks." What effect would discovery or progress have upon such a man? There is little hope he will ever know more than he learned in his class.

I remember reading in the *Journal of the Franklin Institute*, the date I do not now remember, where J. St. Clair Gray gave an electrical view of the source of nervous power.

Starting with the fact that phosphorus existed in the brain and sulphur in the liver, he constructed a cell containing caustic potassa, in which were placed sticks of phosphorus and sulphur; chemical action took place lasting over three months, during which time an electric current was generated whose electro-motive power was superior to a Daniell cell. With this demonstration, he experimented upon living animals (chloroformed) and proved the original assumption. Similar experiments for the last forty years might be quoted, or actual demonstration made to prove not only electricity the source of vital power, but that the galvanic current in the involuntary nerves takes the place of the natural flow of the nervous currents, and creates in the organ supplied functional action similar to the natural.



The pneumo-gastric nerve leading to the stomach being severed in one, of a couple of rabbits, who had been fed the same food, the one operated upon died; the digestion was entirely suspended. The same experiment was repeated, only that the animal operated upon had a galvanic current sent through the disconnected nerve to the seat of digestion, and when both were killed, it was found that digestion had gone on in both animals about the same, showing that the stomach depends upon the nervous stimulus it receives from the brain, and also that that nervous stimulus is electric. It may also be said to have illustrated why mental depression and nervous relaxation seriously impair digestion.

Take the circulation of the blood as an instance. The assertion that the constrictive power of the heart is able to produce all the mechanical effects has long been questioned, and in searching for an explanation, capillary attraction has been quoted, but the nature of this force would act differently than the force required as an explanation. Here comes electro-physiology and clears the matter up. When the blood imbibes its oxygen in the lungs, and the corpuscles become red from the action of the oxygen in uniting with the iron, a positive polarity takes place, or, in other words, electricity is evolved. If the table of the polarity of the natural elements is referred to, we will find iron well toward the positive end of the list, and oxygen the most negative in its polarity, which will at once explain why such an union should produce such a result.

Then again, as further evidence, as the blood flows out into the arterial circulation, containing the elements to build up the tissues of the body, the nervous system sends along with it as fine an electrical device as any manufacturer could devise to induce electricity, in other words, nerves follow the arterial circulation, and the nervous system assimilates by induction the electricity it needs, until, when reaching the capillaries it has been robbed of its nervous feeding power, it returns by the veins in a negative condition.

In this view, an explanation is at once given as to how the blood overcomes the enormous resistance of the large surface to which it is exposed in that wonderfully intricate network through which it passes in the capillary circulation of the system. Also is explained why a change in polarity is occasioned by a change in temperature to any limb or organ; and so on, through all the functions of the system, electro-physiology comes as an enlightener. There is not a functional disorder of the human system that is not caused by an irregular flow of the nervo-vital currents, caused by a change in the polarity of the nerves. In many instances this results in inactivity of organs, which in the case of the kidneys results in rheumatism, gout, diabetes, Bright's disease, and a tendency to functional disorder of the heart, even to the extent of affecting the fluids of the body and involving the polarity of other branches of the nervous system, and so on.

With electro-physiology on the one hand and a knowledge of



electro-physics on the other, these changes of natural polarities and nervous currents can be readily corrected, and by galvanism, irritating acids destroyed by the action of the galvanic negative pole, and excessive alkalies corrected by the action of the galvanic positive pole, or, in the event of an excess of either, they can be excreted by electrolysis.

Varicose veins, relaxations of tissue, degenerations, and eruptions, can be absorbed under the intelligent use of galvanism with a rapidity almost miraculous, and even the domain of surgery is invaded by galvano-cautery.

Many cases hitherto given to the knife of the surgeon are absorbed by the use of galvanism without the knife or galvano-cautery, and polypus, cancer, and many other cases are within the reach of the operation of galvano-cautery. Ten years ago, outside of a competent electrician, one could not get an operation of galvano-cautery performed in the United States, but was obliged to go to Germany or France; but a few of the American practitioners are now only ten years behind on that score, although generally from thirty to forty years behind upon others.

I can remember when attending lectures eighteen years ago, of being thoroughly indoctrinated with the idea of specific lesion as the explanation of neuralgia, that the kidneys were the source of the difficulty, and knowing of a particularly aggravated case where relief temporarily was always obtainable by the use of the Russian or steam bath, and many other cases where relief was obtainable by means suggestive of such a cause, I became settled in that opinion, which became afterward modified to the idea that the same result might and did arise from disorder of the liver and stomach, or either when the other two were natural and healthy; but when every indication (except the neuralgic state), indicated these three organs and apparently all the others to be natural and healthy I was puzzled. To be sure, I could pursue the conventional system of medical reasoning (and assuming the received dogma as divine and unquestioned, indisputable truth, and therefore not benefiting or becoming any wiser, proceed upon that assumption), but instead of doing this I doubted the whole doctrine, and now, with the doctrine of electrophysiology, that a change in the natural polarity of the nerves is the trouble, I see constantly, where consultations of physicians have failed to give even relief, by an intelligent use of electricity relief within the space of *five minutes*, and permanent cures in from two to ten treatments. The changes in natural polarities of nerves are often the result of acid or alkaline states of the fluids of the body, the latter caused by irregularities in the functions of the liver, kidneys, stomach, or bowels, but often by colds where the non-conducting ability of the skin has been partially destroyed by a state of perspiration, and when in this condition exposed to currents of air where the electric radiation is sufficient to interfere with the nervous currents of those nerves whose peripheries are close to the surface; but whatever the



cause, *certain it is* that when treated upon that assumption, I have yet to see the instance where failure to relieve and cure has not been the result, and it is the *result* that is wanted by the patient, the wherefore he leaves to the operator.

The office or function of the spleen still remains a conundrum for the physiologists of the world to scratch their heads over. I would not assert that electro-physiology has discovered the peculiar function of that organ, but certain it is that in the enlargement of the spleen commonly known as "ague cake," if the spleen is treated as the electrical centre of the vital system, it yields almost immediately, and the "ague cake" is reduced, and ague is dispelled from the system with a celerity almost magical.

In plain terms, it has been and can be proved again and again that electricity is the element employed by nature to nourish and operate the animal life of man. It is the source of vital power, and being the source by which nature operates our animal economy, it must be the most natural element to use in assisting nature to correct functional disorders, eliminate poisons, and absorb enlargements caused by degeneration or relaxation of the natural tone of tissue. The "*Vis Medicatrix Naturæ*," the natural medical forces, are what should be assisted. Nature strives for health and only needs assistance, and instead of loading the stomach with drugs, impairing digestion and interfering with that organ, instead of introducing a mineral or other poison into the system, as, for instance, iodine, to affect some particular glandular enlargement and thus reduce the whole glandular system from the reproductive function up, apply electricity direct in diagnosis, discover what is the disturbance in polarity, and assist nature to recover her power. There is hardly a drug used that in its action is specific. It acts upon other organs than the one whose action it is taken to affect, and many afflictions not intended, follow.

And thus, instead of introducing drugs into the system whose action cannot be relied upon except as a general rather than a specific action, electricity can be applied directly to the organs and nerve centres affected.

I admit that an application of electricity unintelligently, without some knowledge of electro-physics, may, and often does, aggravate the very troubles intended to be relieved, still, in intelligent hands, where there is sufficient good sense exercised to recognize the cause of failure, a reversal of the polarity of the application, or a change of the character of the current used, from galvanism to tensional currents (as the case may require), will be followed with success. On the subject of apparatus, the general public (and even those of the medical profession who have arrived at a stage of intelligence sufficient to recognize the utility of the application of electricity) seem to know so little of the subject of electro-physics, that they are unable to distinguish between good and bad batteries. What some physicians seem to want is a flashy *looking* apparatus, nickel-plated,



finished in hard rubber, with innumerable switches, and a complicated appearance that will strike terror or wonder to the heart of their patients when entering their office. This is in keeping with the wise shake of the head and owl-like look of wisdom generally adopted by this class of the profession to overawe the "laity" and impress them with a sense of their great knowledge, a method rarely adopted by men of any real standing who have any well-based confidence in their requirements or abilities. I have now in mind a firm who manufacture an office outfit finished in this style for which they charge three hundred dollars, when for practical worth a much more effective apparatus need not cost more than one hundred dollars complete, in fact, can be manufactured and sold for less than that sum, an apparatus that any committee of experts would not hesitate to pronounce infinitely superior.

It may be set down at the start that all bi-sulphate of mercury batteries now extant are mere toys and unfit for general medical use. In the second place, all bi-chromate of potassium solution batteries may be set down as defective. The bi-chromate solution as compared with a Smee element costs as much for one solution as would run a Smee element for eighteen months, not to mention the trouble. Besides, from the moment the action begins the solution begins to polarize, and from a certain volume at the beginning gradually tapers off until in about thirty minutes the current ceases and you must withdraw your zinc and either await the pleasure of the solution regaining itself, or put in a fresh solution. In the case of a practitioner who has a case of suspended animation, morphine or hydrate of chloral poisoning on hand, when the life of the patient is at stake, the bi-chromate battery becomes a trap and a snare; besides, in electricity you want to deal with a fixed element; "as large as a piece of cheese" won't do in electrical treatment, especially when the same strength or volume of current feels different to different persons, and different to the same person from one hour to the other. Thus a bi-chromate solution starts off with a certain volume and then dwindles down until it runs out.

Again, besides the cost of the renewals of the solution, the bi-chromate zincs are decomposed in an hour's use as much as a Smee element in three or four weeks, while the carbons soon become brittle and break easily, and have to be renewed, when a Smee element platinum will last from one to three years. Again, the solution soon becomes saturated with sulphate of zinc. It will naturally be asked, why does a manufacturer use a bi-chromate solution for his battery? I will tell you. A Smee element, being constant and steady in its action, requires a first-class helix to produce good primary, thermal resistance, and pure faradic effects, while a bi-chromate solution being tense at the start in its galvanism, and having little volume, can operate the galvanic interrupted and primary effects through a primary helix, costing from fifteen to twenty per cent. of that required by a Smee element, and thus by a little nickel-plating, a little black



rubber mounting, and a large commission to quiet the scruples of those who know their true value, a much larger profit is left to the maker. Again, I have seen innumerable advertisements of bi-chromate solution batteries as faradic batteries, pure faradic current, etc., etc., but I have yet to see one that had more than galvanism, interrupted galvanic current, and primary. I have in mind a physician (REGULAR) who was telling me of his success in what he called faradization in a case of rheumatism, when, on examining his nickel-plated bi-chromate catch-penny battery, there was nothing further than the primary current to be got out of it, and what he called the faradic current was the galvanic and primary combination. In a few words, the fact that bi-chromate solution batteries can be sold, is a proof that the purchasers and the general public are ignorant of electro-physics.

There is one patented process by which the bi-chromate cups may be utilized for purposes of actual cautery, but in this cell there is no carbon used.

When apoplexia, heart disease, fits, neuralgia, and such troubles are liable to demand immediate, if not instantaneous attention, I think it will not be long before no household will be considered complete without a good battery, or the education of the family without sufficient knowledge of electro-physics to meet the requirements of such emergencies.

I do not mean by this that every one will become their own electrician, as I feel certain that sufficient knowledge of electro-physics, anatomy, physiology, electro-physiology, electro-therapeutics, and added to all this, that judgment derived from experience, will ever become enough of common property to enable any one who has not given time to the subject to become expert enough to warrant general practice, but I do say, that with a little instruction for special cases (which should be included in the contract of purchase), any one should be able to treat all common deviations from perfect health and thus dispense with those aggravated troubles that require the attention of those more experienced. On the whole, let us take the Shakespearian motto, and say, "Throw physic to the dogs, I'll have none of it."



# ELECTRO-MAGNETISM.

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In the cure of disease, all departments of nature have been ransacked for material wherewith to attain the desired end. The vegetable and mineral kingdoms have given their aid, and many valuable agents have been obtained from each which have been instrumental in saving many lives in the hands of competent physicians and of hastening death in other instances when unskillfully handled. Other assistants have been invoked for the same purpose, and the so-called imponderable agents have been rendered of great service as a means of cure in disease. Much might be written concerning these, but our desire at this time confines us to one, and that one the most important of all—electricity. Probably no single method of relief, no single drug or medicine, can claim so many triumphs in overthrowing the ills the human race is heir to as this invaluable servant of the educated physician. Through its instrumentality, diseases which have resisted all which could otherwise be done, though every effort was skillfully made, have vanished, and the despondent invalid again restored to a life of usefulness. Many arguments might be adduced why electricity should become more generally used than it now is, but a few only are offered. First—it is a pleasant method of cure; second—it is applicable to the most varied evidences of disease; third—its simplicity in management; fourth—its inexpensiveness, when its utility is considered, and, lastly, the relief given the stomach and digestive organs in the freedom from nauseous medicines, which are indispensable in other methods of treatment.

In the application of electricity to the cure of diseases, a most important point to be considered is the selection of proper apparatus. The country is flooded with electro-medical machines of great pretensions, but, in too many instances, of doubtful utility. The failure of these instruments to perform what is claimed for them has thrown discredit on the science of electro-therapeutics and thereby involved medical electricity in difficulties which deter many from, through its agency, seeking relief which they, through it, might readily secure. With these facts in view, the manufacture of electro-medical batteries has been made a study for the past eighteen years, and we not only keep up to the latest discoveries and improvements, but are ahead of all competitors in the superiority of our apparatus. As manufacturers of insulated wire, which is so largely employed in apparatus of this description and of all the component parts of electrical batteries, we possess facilities which no other makers in this country can approach. All the material needed in the construction of medical batteries is produced in our own workshops, and we largely supply other makers with the essentials used in similar machines. It is evident, therefore, that with



the facilities we possess, the experience of over eighteen years, and the practical knowledge of just what is needed in the *practice* of electrotherapeutics, our apparatus should reach a high standard, and this it has done.

That a feeling of prejudice against the use of electricity still exists to a great degree among certain classes in the profession is unfortunately too true. One class will not use it because, having followed the old theory and practice all their lives, they have become so wedded to them that any departure from the "good old school" is looked upon as a species of professional heresy, all new discoveries and improvements being regarded as quackish remedies and "new-fangled innovations" which they will have "none of." Another class will not use it, not because they doubt its value, but simply because electricity having been so generally employed in the past by quacks and other incompetents, it was brought into undeserved disfavor, and they fear they might also be considered quacks if they should use it now. This feeling, however, is unjustified in fact. No branch of medicine and surgery has undergone greater changes and developments nor accomplished more decided and brilliant results during the past twenty-five years than Galvano-Faradism, and the practice of electrotherapeutics and Galvano-cautery is now as far in advance of its practice in the past as is the practice of every other branch of medical and surgical science.

#### APPLICATION OF ELECTRICITY.

The knowledge necessary to treat disease electrically is not necessarily extensive nor difficult to attain. A few simple rules are all that must be mastered, and less trouble is felt in employing this agent, after once comprehending its usefulness, than is the case in discriminating between the multitude of drugs which are employed hap-hazard by the inexperienced in their efforts to relieve disease.

The apparatus itself requires some little attention. When it is to be used, fill the rubber cell to the proper level with the fluid employed to excite the plates forming the galvanic pile or element. To prepare the fluid, add one part of *sulphuric* acid, or oil of vitriol, to six parts of pure water, and allow the mixture to stand fifteen minutes to cool. Hard or limestone water will not answer, and where such exists, rain or river water must be employed. Pour the fluid into the cell carefully, to avoid splashing. If any of the solution should get on any part of the metal or woodwork of the battery, wipe it off at once, to prevent tarnishing of the parts. After filling the rubber cell, lower the zinc and platinum plates gently, until they reach the bottom. By means of the small red wires, connect the appropriate posts of the cell with the helix, or coil. Each post is marked by letters upon the binding screws. The post attached to the platinum plate is marked "P," and that attached to the zinc, "N." Corresponding letters are seen on the two posts of the helix, or coil. Connect the two posts marked "P" by one wire; and the two marked "N" by the other. Should you by accident lose the coiled red connecting wires, by using a piece of *copper* wire of the right length the connection can at any time be made. The connection now being made, by turning the switch on to the connecting post, a slight tap with the



finger will start the vibrator or interrupter into operation, although it usually goes into action at once when properly adjusted. Keep the platinum point and plate of the vibrator clean and free from rust with a penknife or nail file. Attach the conducting cords to the two posts on the front of the machine at the left side, and to the other extremity of the cords fasten the appropriate electrodes, when the apparatus is now ready for use. The currents are intensified by drawing out the regulator at the side of the box.

#### CARE OF APPARATUS.

Keep the machine clean and dry. Should the plates or battery-liquor fizz somewhat like a seidlitz powder after having been in use some time, the zincs need amalgamating. To do this, remove the clamp which binds the plates to the wooden insulator, wash the zincs with clean soft water, and then dip them into a solution of one part of sulphuric acid to eight of water; after dipping them, let them drain, and then, holding them over a saucer, pour on a quantity of metallic mercury or quicksilver. The mercury will adhere in a thin coat to the zinc, which is then said to be amalgamated. Quicksilver can be obtained at any good drug store, and must be kept carefully corked and away from children. It is very heavy, and the bottle should be cautiously handled to prevent fracture. *Never let the mercury touch the platinum-plate, or it will be destroyed.*

If the battery runs too slowly, or the current is too weak when the regulator is drawn out, the fluid needs renewing. If the liquid becomes cloudy it should be allowed to settle, and only the clear portion returned. The rubber-cork must not be lost, as ordinary corks will not stand the destructive effect of the acid. The rubber cell needs only to be kept clean. It is not fragile, but, in case it is broken, another can readily be obtained at a slight charge. The conducting cords should be kept free from twists or knots, and the electrodes clean and bright. Should the vibrator not act promptly, it can be regulated by loosening the screw above it, and gradually turning it down until the right pressure is obtained, when it is fixed by the set nut connected with it. The vibrator is always properly adjusted before leaving our office, and should not be handled unnecessarily.

#### METHODS OF EMPLOYING THE CURRENTS.

The principal methods by which electricity is applied to the body are three in number—*general*, *central*, and *local*.

GENERAL APPLICATIONS are made by passing a large sponge electrode over the entire person, the other pole being applied either to the soles of the feet by a foot-plate, or to the spine, from end to end, or the patient may be seated upon a large sponge electrode, a special one for which purpose is supplied by us to order. The plate is attached to a suitable stool, and will be found of great value in office practice. Many obscure diseases and general neuralgias are successfully treated by this method.

CENTRAL APPLICATIONS are made by pressing the large sponge electrode over the pit of the stomach, just beneath the lower end of the sternum or breast-bone. The current here is passed through the *solar plexus*, from



which radiate nerves to supply the diaphragm, stomach, spleen, liver, kidneys, mesentery, spermatic, and uterine organs. No method of application exceeds or equals this in utility, nor can so many important organs be reached by any other process. The other pole should be applied according to the effect desired, as, for instance, to the groin, to affect the ovaries; to the pubic region, to reach the uterus or bladder; to the side beneath the ribs, if the liver (on the right) or the spleen (on the left) be at fault. The kidneys can be reached by applying the pole to the space just above the hip-bones on either side, or in the region known popularly as "the small of the back." The intestines may be stimulated to increased action by passing the sponge over the front and sides of the abdomen. The heart and lungs are acted on by passing the sponge over either the breast-bone (to reach the heart), or the ribs at the sides, front, and back (to affect the lungs). The positive pole is usually applied to the *solar plexus*, and the negative either locally to the viscera, or generally over the surface, as desired. Moderate currents only are necessary. The regulator at the side which uncovers the coils should be drawn carefully out until just the right strength is attained. The rule is, except in cases of asphyxia, paralysis, or obtunded sensibility, to use only such power as is readily borne with comfort, and sudden shocks or great increase is to be avoided, unless in particular cases. In family practice, or in the hands of non-professional persons, strong or intense currents are to be studiously avoided. This rule applies generally to the use of electric apparatus, and should be carefully observed.

LOCAL APPLICATIONS form a numerous list of methods, which may be indefinitely extended. In some sense all applications are local, but the term applies specifically to applications to separate organs—as the eye, the ear, the nose, the tongue, the throat, the womb, the penis or testicles, the muscles, or special nerves. In certain forms of paralysis only few muscles are involved, such as in writers' palsy or in telegraphers' cramp; here the overworked muscles alone are at fault, and special attention is needed only to these. The hearing being affected, requires attention particularly to the nerves of the ear. Other examples might be given, but a few will suffice: a sprain of the ankle or wrist is a local injury and requires local application; an aneurism is a local defect in an artery and may be locally treated. In these manipulations one pole (generally the positive) is applied to the spine above the affected part, and a suitable electrode is applied to the diseased part through the other pole. In affections of the upper extremities one pole should be placed at the upper part of the spine and the other over the affected part; for the lower extremity either the upper or lower part of the spine may be selected for one pole, the other being employed at the point needing repair. For the body the electrodes may be applied near each other over the affected parts, or one be placed on the spine and the other wherever necessary. The general object is to pass the current through the nerves supplying the parts affected, and additionally in paralysis through the muscles concerned. Certain places known as *motor-points*, at which the nerves of the parts approach the surface, are selected by physicians who are specially skilled in electro-therapeutics for attaining decided results, but these can only be learned by careful study and large experience, and it is unnecessary in a guide such



as this little book is designed to be to revert to them, except in those cases where these points are to be shunned, a matter which will be treated of in the succeeding section.

#### CAUTIONS TO BE EXERCISED IN ELECTRIC APPLICATIONS.

It has been remarked in a former place that only such power is to be employed in the current as may be readily endurable—that for most cases nothing more than can be *comfortably* borne should be employed. In addition to this general caution it is requisite to observe special care in manipulations in certain regions of the body. In diseases requiring treatment applied to the head, caution must be observed when working on the forehead, especially over the brow, much pain being caused if too strong currents are applied to the supra-orbital ridge. The angle of the jaw should be carefully handled, and in applications to the tongue great care is essential to avoid the teeth, which being good conductors permit the passage of electricity through the dental nerves readily, which are extremely painful. In the neck, care is needed in the point just in front of the sterno-mastoid, the prominent muscle running down the side of the neck from behind the ear to the breast-bone. The chest and abdomen stand pretty strong currents as a rule, as also do the upper and lower extremities. Do not use powerful currents over sharp ridges of bone, as, for example, the elbows, the wrists, the knees, or the ankles. Begin each sitting with a slightly milder current than that you stopped with the last time and gradually increase by using the regulator. In running from one post to another it is well to push in the regulator all, or nearly all, the way, especially with the posts which control the currents of high tension.

It should always be borne in mind that strong currents especially produce strong *local* effects, therefore when employing currents of high tension be careful not to irritate the skin or to burn it. Move the electrodes a little from time to time, in order to bring the current to bear at different points in all cases where the treatment is of long duration.

In females the menstrual function is greatly stimulated by electricity, and this fact accounts for the peculiar value of the agent in disorders of the womb and its appendages; even where the application is made at a distant point, the catamenia is apt to be prematurely induced in many instances; this is notably the case when treatment is directed to the brain, spine, or abdomen. The mammary glands also are in such close relationship with the genito-urinary apparatus as to sympathetically affect these organs when electricity is employed for any ailment—as, for instance, in gastralgia or cardialgia. No alarm need result from any irregularity thus produced, as the functions, though accelerated as to time will thereafter appear at the proper interval; in fact, no better agent for the regulation of the function in question is available than electro-magnetism.

#### THERAPEUTIC EFFECT OF ELECTRICAL APPLICATIONS.

In common with many other remedies which are used in the treatment of diseases, electricity possesses qualities classed under various heads. It may, *according to the method of its application*, act as a *stimulant*, or a *sedative*, a *tonic*, which builds up the organism, or a *caustic*, which breaks



down the tissues. It is a decided *alterative* agent, which property gives special value to it therapeutically. It is also a *resolvent*, an effect frequently desirable in the dispersion of tumors or threatened abscesses, where the caustic effect before spoken of is not desired. By the resolution or dispersion of a tumor is meant its gradual disappearance under treatment without suppuration, and this result may be often obtained in the class known as benign or non-malignant growths. In cancerous formations it is generally advisable to break down the tumor at which point the specific virus is concentrated, and if this can be sloughed out before the neighboring lymphatic glands become involved, a cure is more certainly assured than if means were taken to dissipate the growth throughout the system. Electricity owes its great value to the fact that it, more than any other agent, possesses such a control over the nervous and muscular systems. It is well known that muscles contract under the action of the will, through a stimulus or telegram sent to them through the mediumship of its nerves, which in themselves have no power to act on muscular fibre—they are simply conductors, just as the wires in telegraph lines or in our batteries are conductors. Now, a current of electricity sent through the nerves of any part of the body will cause contraction of the muscles governed by these nerves, and this result may be produced by electric currents of various kinds—especially the induced, or static. It must therefore clearly follow that a method of imitating such “life currents,” as we may term the nervous fluid, must be of great value in derangements or failure of the nervous system, and no agent has as yet been discovered which approaches in efficiency that obtained in properly applied electrical currents from properly-constructed machines.

Besides being so valuable an agent in purely nervous disorders, electricity is indispensable in many affections of other departments of the economy. No greater cause of disease in many and varied forms can be cited than that of failure of the so-called “secreting” organs to properly perform their duties in ridding the blood of certain foreign matters by transforming these substances into others which are needed in building up the system. Again, other organs—the “excreting” class—are taxed heavily to throw off effete or worn-out matters which, if retained, are absolutely poisonous to the system, and, like all hard-worked agents, these laborers now and then go idle, to the great concern of the balance of the organism. As work must be done to keep the body alive through the food thus obtained, so also must work be done to keep the body from dying from the retention of effete parts of this same food after its nutritive juices have been extracted and stored up in the blood. No factory or workshop can work satisfactorily unless all its departments are in harmonious operation, and the analogy in the instance of the human laboratory is perfect. Derangements of the liver are at the bottom of very many diseases which destroy lives by thousands yearly, and many remedies employed in these hepatic irregularities are as bad as the cause they seek to remove. Derangements of the kidneys are of frequent occurrence, and are obscure in their nature to the majority of physicians, until irreparable mischief has been wrought. Derangements of the stomach are so common in this country as to need merely mention, yet how intractable these troubles are to the usual plan employed for their cure. The mesenteric and lym-



phatic glands, the spleen, and the system of complicated absorbents whose integrity is imperatively demanded that perfect blood shall be produced, are all liable to misfortune, and their repair when disordered is by no means easily accomplished even when the culpable organ is detected. Now in *electricity* we have at our command an agent at once prompt, reliable, efficient, and pleasant in the management of these multiplied derangements. How greatly, therefore, is the problem simplified in relation to the discrimination as to which organ is at fault, and that diagnosis being made, how to remedy the fault. The management of such defects in the physiological action is reduced to its utmost simplicity, and the minimum of medical skill suffices for the care of the suffering patient.

In addition to its effect upon well-defined diseases of one or other of the systems—the nervous, muscular lymphatic, or circulatory—we possess in electricity a power over obscure disorders not available in any other agent. How often do we hear of a person who is totally unable to follow his or her usual occupation because of illness, yet when questioned neither the patient or physician can accurately define the disease in its nature, name or result. As all radical medical treatment must be based upon an intelligent appreciation of the cause, the progress and the termination of disease, how difficult the care of such complaints must be to those unfortunately afflicted and to their attendants. Many wretched sufferers abandoned to die and to whom death would be welcomed as a friend, have, through electricity and it alone, once more entered into life's duties with hopes renewed, health regained, and happiness restored, where but for it nothing but a dismal future lay before them, suffering only ending in the grave.

With no claim to supernatural power, electricity holds out to the suffering from obscure disease hope of recovered health and strength, and from this agent alone in too many cases can relief be looked for.

With this general view of the capabilities of electricity as a therapeutic agent, we go on to the methods of its employment in particular diseases, those more commonly met with in daily life, and we suggest in these remarks the simplest methods and the easiest manner of applying them. Such diseases as are not found in the following catalogue are those which require the oversight of a professional man, and even in certain cases some of these herein alluded to are better managed by a physician.

It is wise, of course, in electrical treatment, as in the usual domestic management of diseases, to seek medical aid should relief not be obtained in time, or unforeseen or alarming symptoms be developed. The remarks to follow are intended for the guidance of the family, not for professional gentlemen, who in their libraries should include some of the more extended volumes on electricity, many of which are extremely valuable.



## DISEASES IN WHICH ELECTRICITY IS CURATIVE.

Ague, Anemia, Aphonia, Amenorrhœa, Aneurism, Anal prolapsus, Anasthesia, Asphyxia, Asthma.	Impotency, Inanition.
Bilious disorders, Blenorrhœa, Boils, Bright's Disease.	Jaundice.
Cancer, Colic, Constipation, Catarrh, Cataract, Consumption.	Lameness, Leucorrhœa.
Deafness, Debility, Diabetes, Dyspepsia.	Meningitis.
Excema, Erysipelas, and all skin diseases.	Neuralgia, Nervousness.
Fistula, Felons.	Paralysis, Pectoral angina, Pain, Pneumonia.
Gout, Gravel, Goitre.	Rheumatism.
Headache, Hepatitis, Hemorrhage, Hemorrhoids.	Stricture, Spermatorrhœa.
	Uterine irritation,
	Vertigo, Venereal exhaustion, Varicocene.
	White swelling.

**AGUE.**—This affection will frequently give way to electrical treatment after the failure of everything else. Apply the current by the central method, treating the spleen with negative pole.

**ANEMIA.**—Want of blood or deficient stability of that fluid is the result of impaired nutrition. Apply by central manipulation as in ague.

**APHONIA.**—Loss of voice. Apply the negative pole to the thyroid cartilage (or Adam's apple), and the positive to the spine below the base of the brain. Use moderate currents only.

**AMENORRHŒA.**—Absence of the menstrual flow may be corrected by passing the current through the uterus, or womb, and the ovaries. Apply the positive pole to the small of the back and the negative over the womb or to its neck, inside the vagina. Use strong currents.

**ANEURISM.**—*This disease requires the treatment of a skillful surgeon.* Electrical currents are either passed through the diseased artery by large electrodes, or needles are introduced cautiously into the sac and coagulation induced.

**ANAL PROLAPSUS.**—Apply mild currents to the protruded mucous membrane, placing the positive pole upon the anus, the negative to the spine above the sacrum, or small of back.

**ANASTHESIA.**—The wire scourge is employed over the anesthetic points with strong currents. Use the negative to the brush, the positive to the cervical spine.

**ASPHYXIA.**—Apply strong currents from the spine to the front of the chest. Alternate by the central method.

**ASTHMA.**—This disease requires steady treatment, similar to that recommended for asphyxia, with moderately mild currents.

**BILIOUS DISORDERS.**—Apply the positive pole to the spine about opposite the stomach, and move the negative pole through a large sponge electrode over the liver and spleen. Do this three times a day until relief is obtained, then less frequent treatment will suffice.



**BLENNORRHOEA.**—Direct the current from the sacrum to the urinary organs, using, if necessary, in severe cases, the urethral electrodes, or the vaginal instrument.

**BOILS** or carbuncles are frequently dissipated before attaining any size by currents being passed through them. Apply the negative to the boil, the positive to the feet or some distant point where it can do no harm.

**BRIGHT'S DISEASE.**—Use negative pole over the kidneys, positive under the feet. A strong *galvanic current* will produce marked benefit.

**CONSUMPTION.**—Many cases given up to die that have fallen into our hands are now strong and healthy. Consumption, when not too far advanced, can be readily cured by electricity. Even when in its last stages, electricity gives great relief. When far advanced, especially when there is tuberculous abscess, care should be exercised to use gentle currents, treating as in pneumonia. Where there is great weakness and exhaustion, place negative on spine; let the operator (who should be a healthy person) take positive in left hand and treat through himself, placing the full breadth of the right hand fully upon the skin of the patient's breast, slowly going over the whole surface. General treatment will be also useful as a tonic.

**CANCER.**—The negative pole should invariably be used upon the tumor, and the treatment must be *persistent*. The positive may be placed at the feet or back, anywhere far enough away to insure no interference with the negative. When the tumor is not too large, galvano-cautery can be employed.

**COLIC.**—Apply the current over and through the stomach and bowels, alternating the direction. Pass the current from one side to the other, then from the front of the abdomen to the spine, and then in the reverse direction; use large sponge electrodes wet with *hot* water or with whisky and laudanum.

**CONSTIPATION.**—The current should be passed entirely through the alimentary canal. Use the tongue electrode, or a sponge holder to the stomach and the other pole to the anus. Apply by the general and central methods to the entire surface of the abdomen, sides, front, and back. From this one disease arises a large number of others, and by removing constipation you will readily relieve or cure them.

**CATARACT.**—Readily curable, but being a delicate operation, where wrong treatment would be dangerous, none but a *competent* electrician should be employed.

**CATARRH.**—With negative on nasal electrode, use *galvanic* current, regulating current by sponge on positive pole, patient resting hand on sponge and thereby regulating current.

**DEAFNESS.**—Direct mild currents through, from ear to ear, and from the ear on the affected side to the throat by means of the aural electrode. Apply the positive current to the ear by our aural electrode, or by a small wire wrapped with wet cotton, cautiously introduced, and the negative to a point behind the ear (the mastoid bone). Each method may be efficient, according to the cause of the deafness.



**DEBILITY.**—Apply by the general method, and where the weakened organs are specially marked, direct the treatment principally to them. Frequent alternations in direction of the current are advisable.

**DIABETES.**—Set on positive, negative to kidneys, and treat with negative the full length of spine. General tonic treatment is necessary.

**DYSPEPSIA.**—Treat as in constipation, and with positive to spine and solar plexus, alternating the negative from liver to spleen. Use the anti-constipator.

**EXCEMA.**—Negative pole on affected part, positive at feet, or convenient point.

**ERYSIPELAS.**—Readily cured with *galvanic* current, with ordinary currents, treat as in excema; the same rule applies to all skin diseases.

**FISTULA.**—Use wire electrode introduced as deeply as possible with negative pole, reverse the current a moment at end of treatment.

**FELON.**—Negative pole in hot water, the current as strong as can be borne and water as hot as comfortable.

**GOUT.**—This painful affection should be treated by applying the negative pole to the affected joint, and the positive to a point higher up the leg. Use mild currents, but gradually increase the intensity until the patient cannot comfortably bear more. The duration of its application should be long. A mild current continuously maintained for several hours will often break up the trouble in a short time.

**GRAVEL.**—Some varieties of gravel originate in the kidneys, and others in the bladder. They should be treated by application of negative to the organs at fault.

**GOITRE.**—Apply negative on lump, the positive any point convenient out of the way. Positive on throat is likely to aggravate the trouble and should be avoided.

**HEADACHE.**—The affection is generally merely a symptom of stomach disorder, and should therefore be treated on general principles. If of purely *nervous* origin pass mild currents through the temples and back of the head. The cause of the pain should be determined before treatment. Frequently it is really neuralgia.

**HEPATITIS.**—Derangements of the liver require applications directly over the organ, together with others to the spine on a level with the gland which is at fault, same as constipation.

**HEMORRHAGE.**—Apply *positive* to the bleeding point, or if the flow is from the womb, direct the current through that organ. If from the lungs apply positive to the chest-wall, especially about the upper part of the lung.

**HEMORRHOIDS.**—Same as anal prolapse.

**IMPOTENCE.**—Here electricity is of great service. Apply negative by a urethral electrode to the neck of the bladder, and to the perineum and testicles by sponge electrodes. Stimulate the spine to increased action by currents passed through its entire length, and locally up and down twice daily.



**INANITION.**—In new-born infants electric treatment will frequently restore suspended breathing. Use mild currents to the chest and abdomen.

**JAUNDICE.**—Employ as directed in Hepatitis.

**LAMENESS.**—Stimulate the affected muscles by moderately strong currents, changing the direction of the current frequently.

**LEUCORRŒA.**—Apply positive pole by vaginal electrode to the vagina and to the neck of the womb, negative pole on sacrum. Finish treatment with Faradic current. Wet electrode in alum water, and use alum water injections.

**MENINGITIS.**—Positive at sacrum, alternate with feet; the negative at head of spine. General treatment will be found useful.

**NEURALGIA.**—No disease is more difficult of cure by the usual treatment, and none more curable by electricity. The general American complaint above all others is neuralgia, and thousands are suffering who can be readily and quickly cured. The most widely popular plans of treating this formidable disease are of doubtful utility. Use negative pole on painful point, positive at any convenient point away. In severe cases of long standing, the central method is demanded, and is useful in all cases. The patient should live well—have good diet, keep the bowels open regularly, sleep sufficiently, and avoid all cold and dampness. Some simple tonic, such as the Compound Tincture of Gentian, would be of service, together with plenty of exercise in the open air, either by walking or riding.

**NERVOUSNESS.**—Tone up the system by general and central applications two or three times daily.

**PARALYSIS.**—Prof. Fieber, of Vienna, whose experience with this disease is the most extensive, probably, of any one living, declares electricity to be the only reliable and efficient remedy. When of recent date, if it is possible to obtain the services of a competent electrician who has a strong *galvanic current* at his disposal, no time should be lost, as with the negative pole in galvanism, if it is hemiplegia, the clot is readily dissolved and the case curable in a few treatments, but if of some standing, especially if atrophy of the muscle has set in, although eventually curable, *persistent* treatment will be required. With ordinary currents use general treatment by the central method, for its tonic effect upon the nervous system, and special treatment by the negative pole upon the head of the nerves affected, the positive at their extremities.

**PECTORAL ANGINA.**—This often suddenly fatal disease is at times averted by prompt treatment applied over the cardiac space—between the breast-bone and the left nipple. Strong currents are demanded, and treatment must be prompt. Positive to back, negative to cardiac space. Include the Faradic current in the circuit. Placing positive on left side of spine below shoulder-blade and negative same side above shoulder-blade, has in practice been found very effective.

**PNEUMONIA.**—Positive to spine about fifth vertebra, negative generally over chest; also, as in consumption, positive through operator.

**QUINSY.**—Negative to throat, positive to feet.



**RHEUMATISM.**—Apply to the painful joints with large sponge electrodes wet with hot vinegar, or whisky and water, also to the muscles affected. Frequent treatment is indicated.

**STRICTURE.**—Stricture of the urethra is readily cured by means of the electrodes which we manufacture. The ordinary bougies cannot be depended on. The current is passed through from the perinæum or pubes to the negative at the point of stricture with the urethral electrode, gently at first, but gradually increased until the stricture relaxes. Daily applications are demanded. Great care should be observed; in fact, none but a competent physician or electrician should operate in such cases.

**SPERMATORRHŒA.**—Readily curable. Proceed as in Impotence.

**UTERINE IRRITATION.**—All diseases of the womb are relieved promptly by electricity. The current is to be passed from the abdomen through to the vagina, by placing large sponge electrodes on the space above the pubes (positive pole) and attaching the other (negative pole) to either a vaginal or uterine electrode, as may be requisite. The sittings should be prolonged to half an hour or more in severe cases. Uterine inflammation is treated in a similar method.

**VERTIGO.**—General dizziness is from stomach or brain derangement. Determine which, and treat accordingly.

**VENEREAL EXHAUSTION.**—As in Impotence.

**VARICOCELE.**—The distention of the spermatic veins is promptly remedied by mild currents passed from the testicle to the lumbar region, or to the supra-pubic space. Positive in bowl with scrotum, negative with sponge-handle on pubes, groin, and sacrum.

**WHITE SWELLING.**—Apply local treatment to the affected parts, using mild currents and large sponges.

### **ELECTRICITY IN MALE SEXUAL DISORDERS.**

No department of the healing art has had greater demands made upon it than that comprising the management of defects, either natural or acquired, in the genito-urinary tract, particularly in the male sex. The amount of suffering which exists in this exceedingly important division of practical medicine is unknown to the public at large and is underrated by the medical profession, except in the case of those gentlemen who have devoted their time and talents to this difficult branch. The bad effects which follow unskilled treatment of such maladies is peculiarly felt by young men between the age of puberty and twenty-five, at which time the system is generally perfecting its development. Any defect of this nature allowed to go unchecked must of necessity leave the constitution defective during its subsequent existence, and the misery thus entailed is not confined to the sufferer himself, but is transferred to his posterity in the shape of ill-developed, weakly, and diseased children. Much of the unharmless relations in married life are due to sexual defects, which, originally bad, are made worse by the demand thus made upon them, and which, being beyond their power to perform, are still further destroyed by unwise



stimulation through drugs, which, though temporarily infusing vigor, in the end leave matters infinitely weaker than before.

One of the most common defects in the sexual apparatus is *impotence*. Almost every drug known to the profession has at some time been credited with power to alleviate this distressful condition; but it is rare that a real cure follows the treatment thus pursued. Electricity, on the contrary, invariably succeeds in radically removing this mortifying disability, and the generous tone given to the system at large through intelligent employment of the battery not only strengthens the organs at fault, but builds up the whole body, thus rendering it capable of thwarting disease in other forms.

*Spermatorrhœa*, or unavoidable seminal emissions, is another very common trouble in the young. The greater number of those thus unfortunately afflicted fall into the hands of advertising quacks, who do literally nothing for their benefit. The truth is that drugs alone have little power to alter the diseased conditions present, and it is in skillfully applied electricity that the cure must be had. In either of the affections named, the current should be applied daily to the organs by placing the positive pole upon the lower part of the spine (or backbone) and the negative in the space just behind the testicles. After allowing the current to pass in this position for five minutes, remove the negative to the point just above the pubic bone (or the lowest part of the abdomen). Allow the current to flow thus for five minutes and then apply through the whole length of the spine, from the head to the hips. The employment of the current by the "General" method will be found of extreme value as a tonic to the system at large, and if decided nervous prostration exists, the "Central" method should be used at each sitting. In all cases the application of a mild current for a few minutes after undressing for the night will be of immense value.

#### ITS OBSTETRICAL VALUE.

We have seen recorded in several of the more prominent Medical Journals, during the last two years, some extremely interesting cases in which, from uterine inertia, the progress of labor has been entirely suspended in spite of all that could be done in the ordinary methods to sustain the uterus in its attempts to empty itself. After the failure had become evident, electricity was resorted to, and in all the cases thus recorded (which are twenty-six in number) the most prompt and gratifying results were attained without delay, and the accouchement terminated, greatly to the relief of the patient and the attending physician. It is evident that an agent thus demonstrated to be reliable under circumstances which every practitioner knows from experience to be among the most tiresome and unpleasant to encounter, should be available at all times, and it is therefore a matter of personal interest that those who have an extended or even moderate obstetrical practice should possess a reliable medical battery, such as we offer in the several forms manufactured by ourselves. A large number of the cases referred to were in the hands of one of the gentlemen whose testimonial is appended on another page, and we are authorized to refer to him if desired.



In that most dreaded complication of labor—post-partum hemorrhage—which has carried off so many unfortunate women after an apparently safe delivery, recent testimony has conclusively shown that in electro magnetism we possess an agent which cannot be approached in utility, promptness, or permanent effect by any other heretofore employed. Contraction of the womb *must* be produced and firmly maintained in all hemorrhagic cases, or the result will inevitably be fatal. Ice is not always to be had, nor is it always effectual. Ergot is not habitually efficient, and in country practice a reliable article is not always obtainable. If, then, some substitute can be found which subserves the desired end, which is at all times to be depended on, and which the practitioner can retain in his possession, not being dependent upon the druggist or the faculty, that remedy should be a part and parcel of the obstetrician's armament just as much so as is his forceps, his catheter, or his pocket case; and this especially in districts where the aid of a professional brother is not readily obtainable, and where skilled lying-in nurses are few and far between. No agent, strychnia not excepted, has greater power over striped or unstriped muscular fibre than the electric current. The womb contracts promptly and firmly under its stimulus; time, so valuable, is saved; cleanliness, so essential to the comfort of the already greatly exhausted patient, is assured. The danger attached to intra-uterine injections, especially of powerful styptics, such as the salts of iron, now so greatly in vogue by too many practitioners, is averted, and we possess in electricity the certain power so greatly desired.

The gentleman spoken of above has published a most interesting series of cases, illustrating most forcibly the value of Faradic induction currents in post-partum hemorrhage. If this one point alone is considered, it presents an insurmountable reason why every general practitioner ought to possess an efficient electro-magnetic machine.

In deficient involution of the womb after labor, which results in a long train of evils, we may secure a valuable assistant in electricity. The undue weight of the uterus in such cases results in the dragging of the organ down so low in the pelvis as to frequently produce serious changes in its normal relation to adjacent parts, such as tension of the various ligaments, misplacement of the ovaries, pressure on the bladder or rectum, all of which cause much suffering, and are, if not speedily relieved, difficult of cure. The necessary condensation of the uterine body is attained in a thorough manner by electric treatment, and the stomach left thus unembarrassed by medicines, *which is a valuable point both in favor of the mother and her infant.* There is no doubt that in many instances lasting harm is done the delicate child through the absorption of energetic medicines given its mother for the relief of such derangements as we have referred to. Tests not at all delicate or difficult may be used by those interested, which will determine the truth of this assertion, and it is the duty of the physician to see that no unnecessary medication be employed when it is evident that the lacteal food of the infant is so readily charged with the drugs thus administered. The point here made is of vast importance, and the writer is satisfied that more injury has resulted from the indiscriminate use of powerful (or even the so-called harmless and simple articles) of the *materia medica* than the majority of the medical profession are aware of. When we remember that the infant for many months is dependent upon



the mammary secretion for its nourishment and growth, and that upon the integrity of the food thus imbibed depends the health as well as the strength of the little nursling, it behooves us to see to it that the sustenance thus given is uncontaminated by deleterious substances. The powerful medicines at present employed for the relief of defective involution, for mammary complications and disorders of the nursing period have, beyond question, injured irreparably many infants, and wonder takes the place of common sense in accounting for the puny development, the constant ailing, and the permanent disabilities thus engendered. Electricity, properly applied, is of all other remedies the most valuable and efficient in the control of the maladies under consideration. With it all good is secured, all harm avoided. It is, therefore, wrong to look to injurious drugs for aid where this notably superior servant is ready to do our bidding, and to do it well. When practitioners investigate this matter for themselves they will at the same time enter upon a method of relief, not only to their patients, but to themselves, from the simplification of what now is a complicated and unsatisfactory plan of treatment.

#### CONCLUSION.

We have now suggested the really important points as applicable to electro-medical treatment. If our directions be observed, no difficulty will occur in management of either apparatus or patient. In all disease such precautions should be observed as common sense directs. The diet of the invalid is important. Allow only such food as is readily digestible; see that cleanliness of person is maintained and cheerfulness of mind secured. With care and patience, few disorders of the human frame will resent a cure by electro-magnetism, and whilst we claim no supernatural power for it, we know that no one therapeutic agent can approach in efficiency a first-class battery.

Appended is our catalogue of electrodes and appliances. Any information required not found therein will be given by letter or on personal application.

## PHYSICIAN'S VISITING BATTERY.

### LATEST PORTABLE BATTERY.

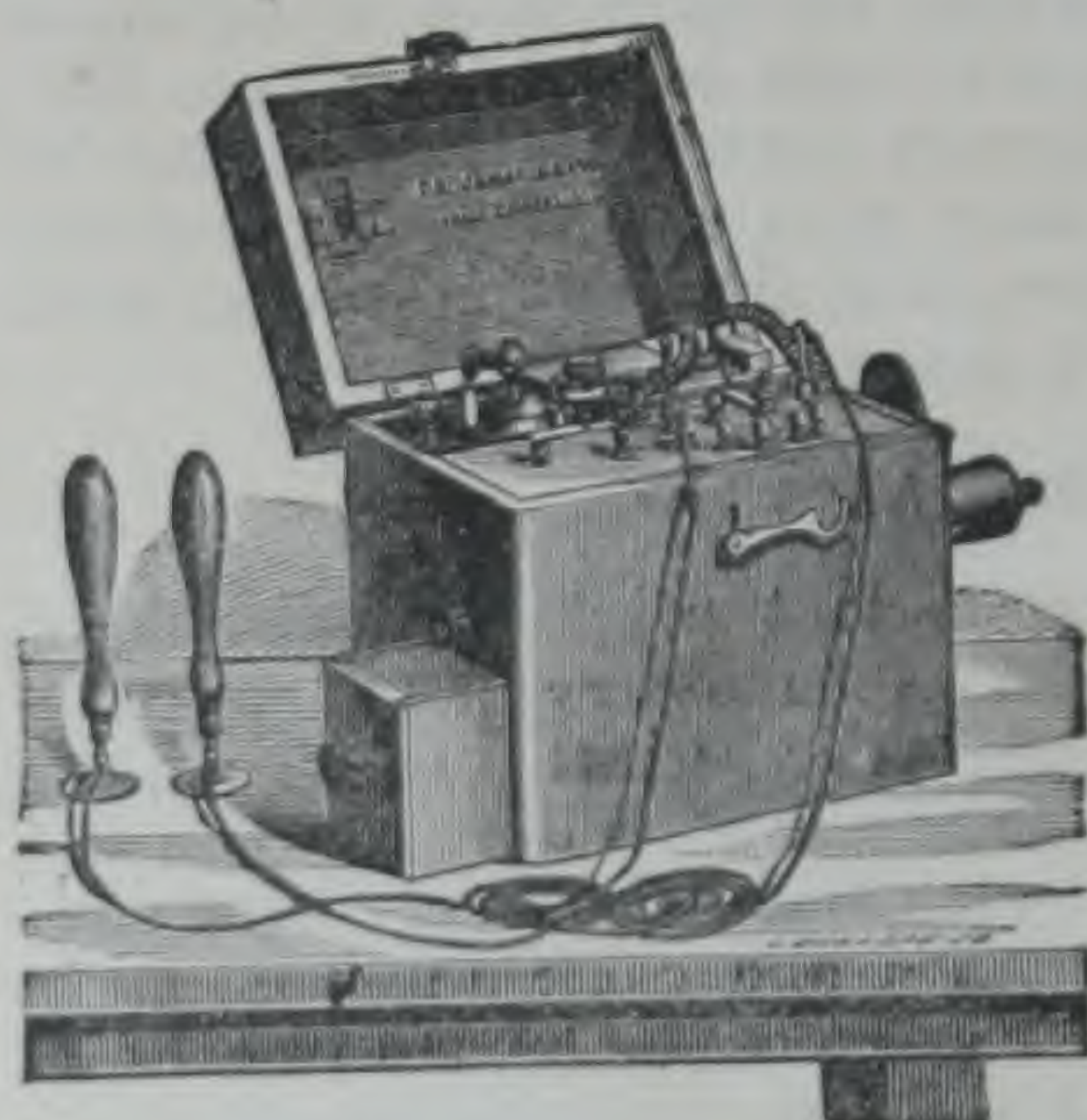
The Physician's Visiting Battery is one of the most convenient either for carrying or office use, as it is as strong as the largest and only weighs about four and a half pounds, having the best combination of currents for all purposes.

This battery is *par excellence* the best battery extant, and no expense has been spared to bring it to its present state of perfection; the best material within reach has been employed in its manufacture. It is winning "golden opinions" wherever it goes.

The different currents are as follows: "A" and "B," galvanic; "A" and



"C," galvanic and primary; "A" and "D" and "A" and "E," galvanic, primary, and thermal; "A" and "F" and "A" and "G," galvanic, primary thermal, and resistance; "A" and "H" include the above with pure Faradic. To cut off the galvanic current leave out "A" and "B." To cut off the primary current, leave out "C." To cut off the thermal current, leave out "D." To cut off the resistance, use "G" and "H." To reverse the current, change the order of the pole cord ends.



Physician's Visiting Battery with two small Electrodes and two large Copper Plate Electrodes, etc..... \$25 00

The above battery gives a complete portable instrument, and does away with the necessity, in many cases, for carrying the heavy galvanic apparatus.

The right-hand rubber cup is for the acid solution. The left-hand one is a drip cup. Drain the elements into the acid-cup after using the battery, and transfer them to the drip cup. (This can be done by detaching the connecting wires from the binding posts on the instrument.)

HOW TO MAKE THE ACID SOLUTION:—To twelve fluid ounces of water add two fluid ounces of Sulphuric Acid (Oil of Vitriol). Use when cold.

Never allow mercury to touch the platinum plate. Never close the battery lid without first corking the acid cup. If the spring does not vibrate promptly on putting the elements into the acid, give it a slight impetus with the finger.



LITTLE GIANT, Smee element nickel-plated, with fine finish.....\$30 00  
 LITTLE GIANT, plain finish..... \$25 00

No. 1. Galvanic Current.

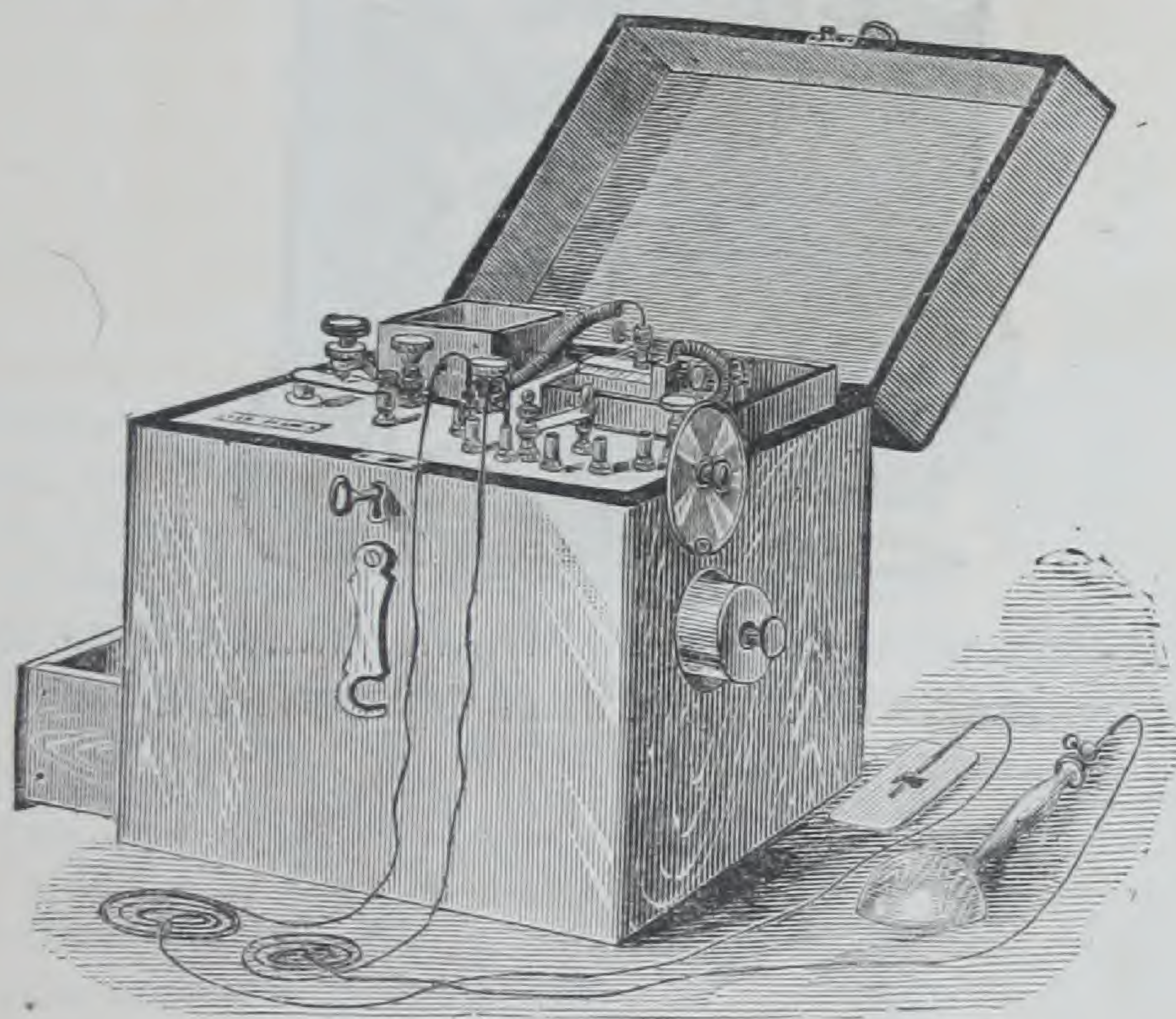
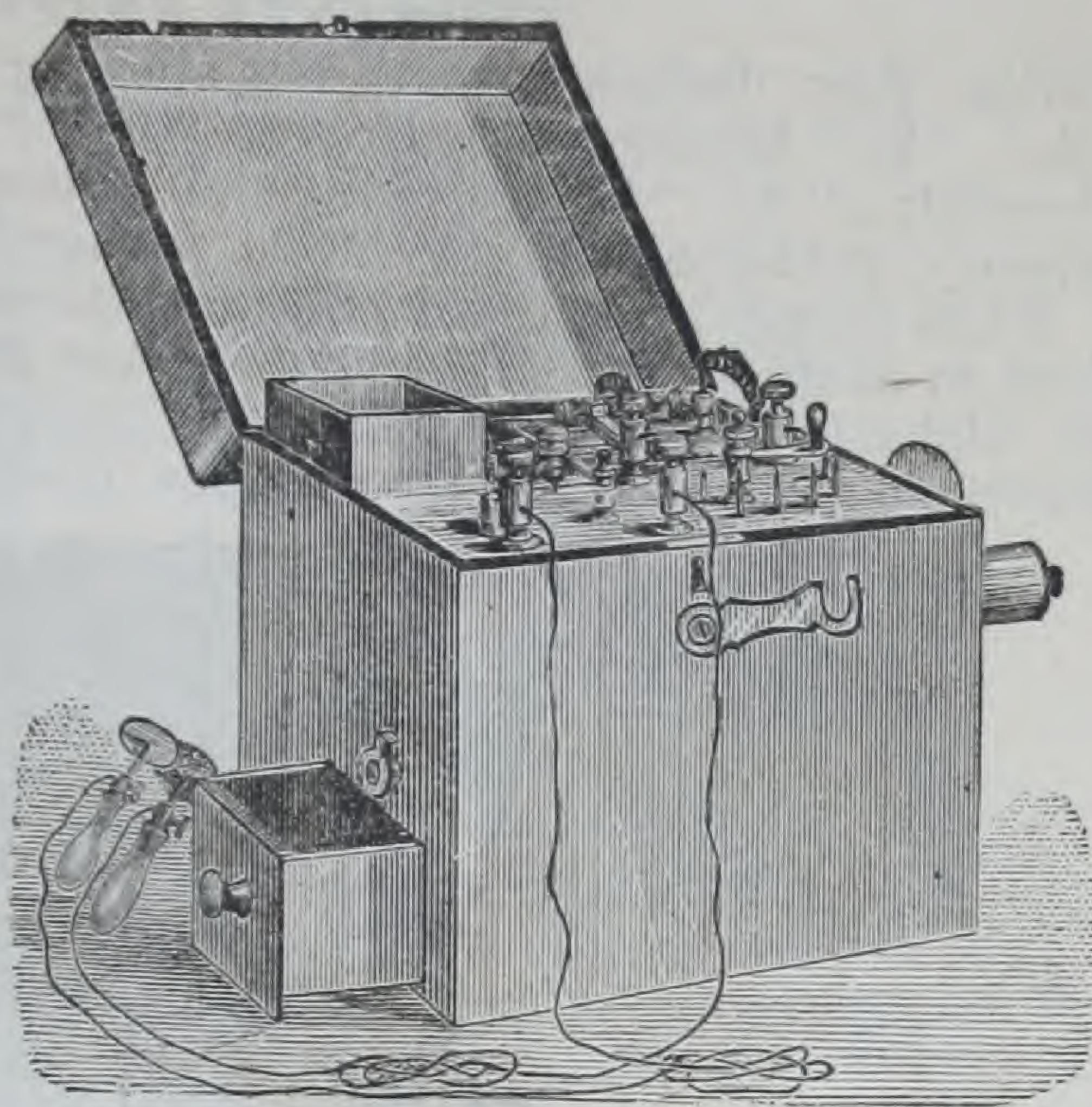
" 2. " and Primary Current.

" 3. " and extra Current.

" 4. " " Secondary "

" 5. Thermal Current.

" 6. Pure Faradic Current.



French Circular Line Battery, with 8 posts.....\$30 00

" A " and " B," galvanic; " A " and " C," galvanic and primary; " A " and " D " and " A " and " E," galvanic, primary and thermal; " A " and " F " and " A " and " G," galvanic, primary, thermal, and resistance; " A " and " H " includes the above with the pure Faradic.

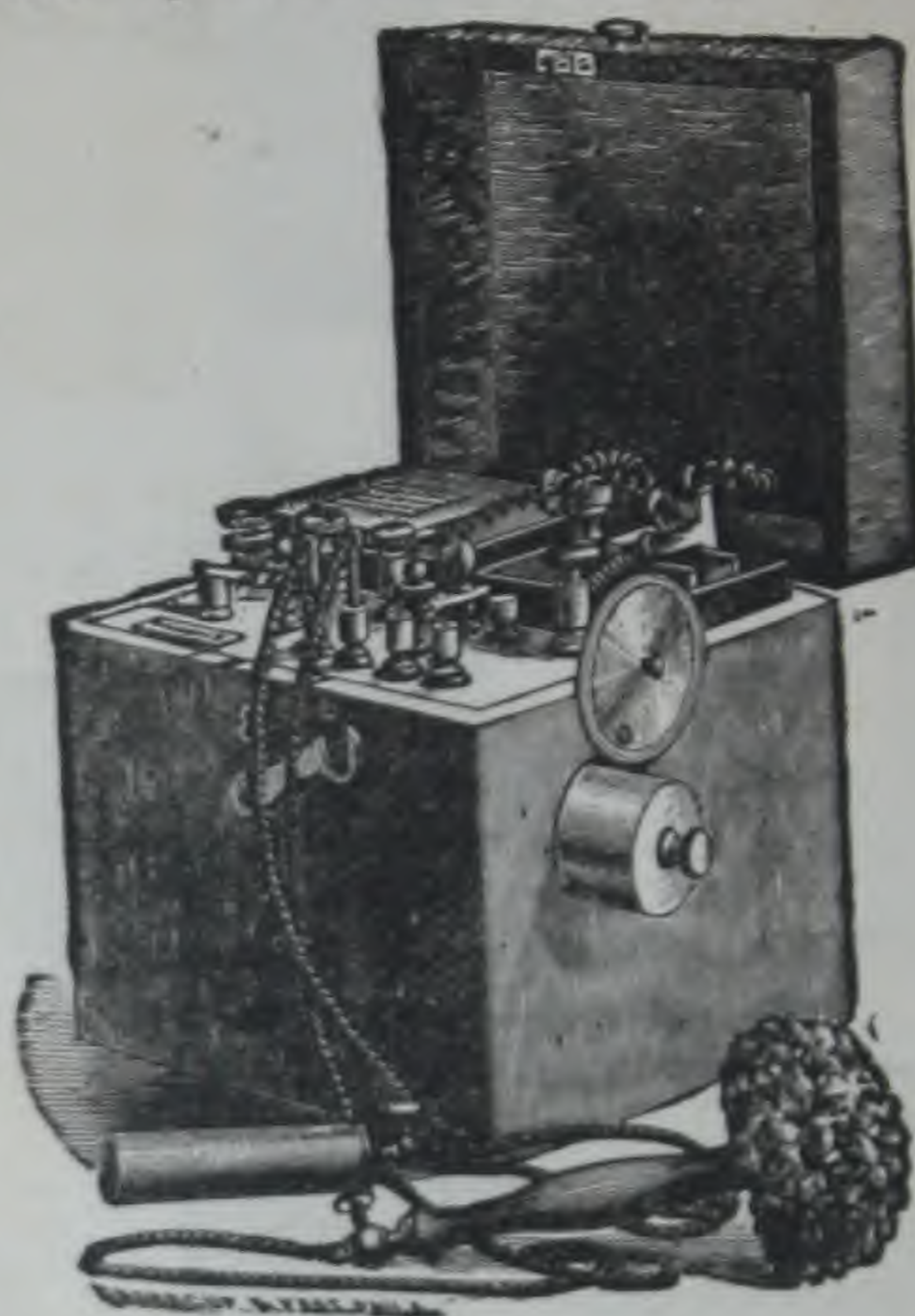
To cut off the galvanic current leave out " A " and " B." To cut off the primary current leave out " C." To cut off the thermal current leave out " D." To cut off the resistance use " G " and " H."



**FOUR-POST BATTERY.**

Giving three distinct currents and allowing six combination currents. "A" "B," interrupted galvanic; "B" "C," primary; "C" "D," secondary; "A" "C," galvanic and primary; "A" "D," galvanic, primary, and secondary; "B" "D," primary and secondary.

When the cell is connected with the Instrument according to the directions, in using any two of the lettered posts, the first letter in the order of the alphabet is positive, while the succeeding one is negative. To determine the direction by the sensation, the negative is felt more intense.



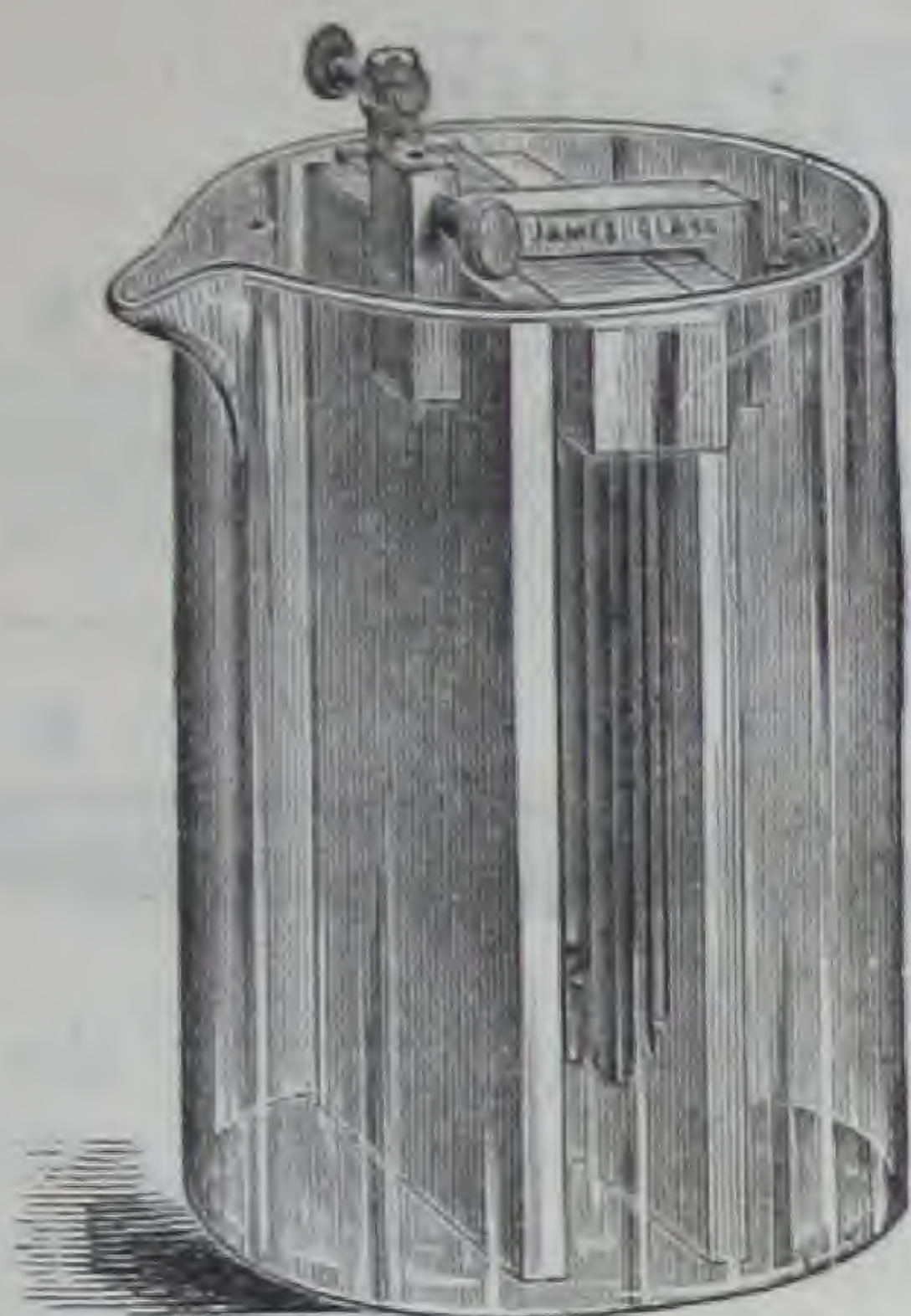
Four-Post Battery, plain finish.....\$20 00

**MAGNETO-ELECTRIC MACHINES.**

Complete in fine finished Case.....\$10 00

This machine is operated without a cell.





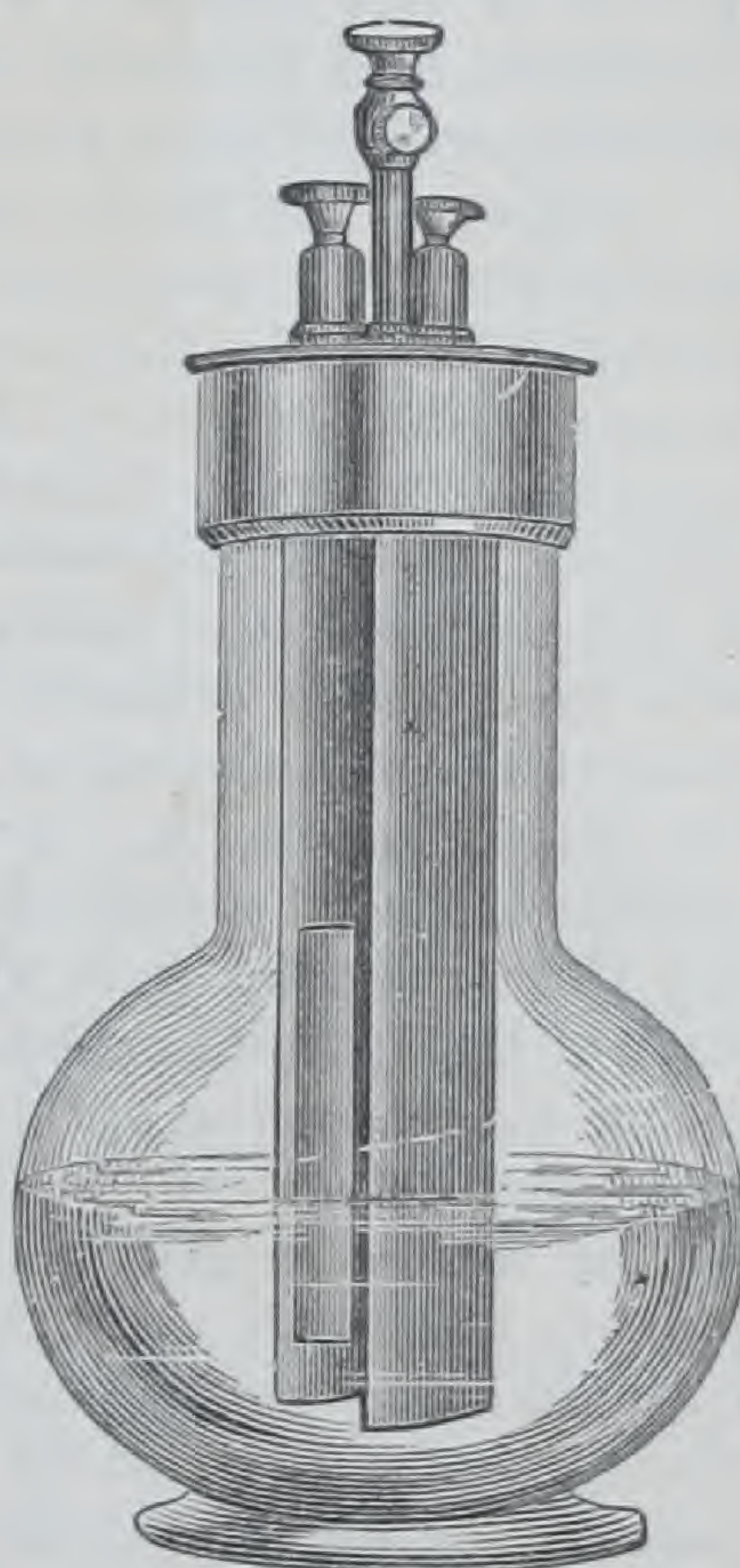
Smee Cell, Zinc and Platina  
Plates .....\$3 00



Platina Plates for Smee Cells, \$1 25  
Zinc, " " 50

#### THE GRENET BATTERY.

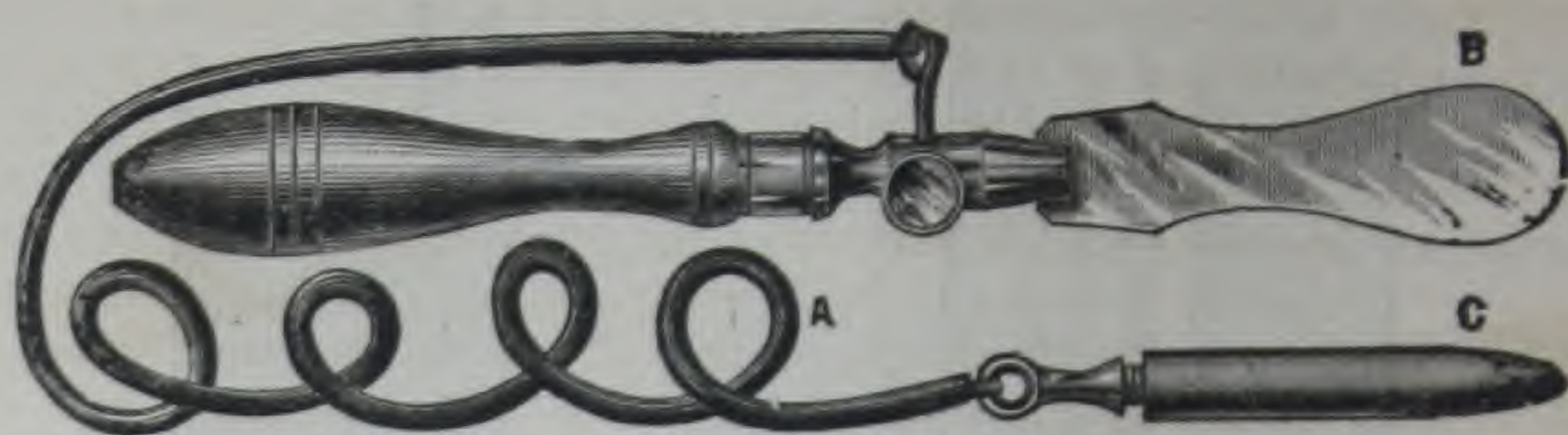
This Battery is especially adapted for experimental and illustrative purposes. It occupies but little space, furnishes an immense quantity of current, is beautiful in design, and, as the zinc can be raised from the fluid, may be kept charged, ready for use, for many months, and can be set in action any time when required by simply depressing the brass rod which slides through the centre of the cover of the cell, and to which the zinc is attached. For operating Induction Coils and Electro-Medical Instruments it is unequaled.



No. 1, 6 inches high.....	\$2 50
" 2, 8 " .....	4 50
" 3, 10 " .....	5 50
" 4, 12 " .....	6 50
Extra Zincs, each .....	25



## THE ANTI-CONSTIPATOR.



A simple galvanic device for the cure of constipation. "A," the tongue electrode, is silver, the anode, "B," is the insulated connecting cord; "C," the rectal electrode (the cathode), is of composition metal, a compound of zinc with other more positively polarized metals. The usual indiscriminate use of aloetic and mercurial cathartics has done great harm, as after the excitation has passed off the bowels are left in a worse condition than before, and constant drugging is necessary, as the natural action is destroyed. By the use of the anti-constipator the entire line of the intestinal canal is stimulated (as the mucous membrane is the best conductor of the system), and natural action is induced. In biliousness, dyspepsia, and headache caused by indigestion, it will be found the most pleasant and effective means of relief.

"Although the whole arrangement can be placed in a moderate-sized pocket-book, the current developed during its use is equal nearly to that from a small cell  $1 \times 1\frac{1}{2} \times 5$  inches, the current strength being two millivebers when in actual use, and nearly five millivebers when the elements were placed in a moderately strong saline solution, as, for instance, sodium or ammonium chloride, and the conducting cord replaced by a wire six inches in length. A simple method of testing the intensity of this little couple is to insert the zinc negative, or cathode, "C," in the anterior nose, pushing it up as far toward the frontal sinus as possible without eliciting discomfort, and placing the silver anode "A," or positive electrode upon the tongue, keeping the conducting cord disconnected. Now make and break the circuit by touching the separated pole with the pin at the free end of the cord, and the flash of light produced by all galvanic applications in this locality, through reflex action on the optic nerve, will at once be developed. The current is sufficiently powerful to stimulate intestinal muscular contraction throughout its whole length, and its therapeutic effect is obtained by simply placing the anode upon the tongue and closing the mouth upon it, the cathode being passed nearly the whole length into the anus, the necessary acidity being supplied by the fluid in the mouth and rectum. In some patients a single application before going to, or while in the closet, for five to fifteen minutes, suffices; in others it should be used at bedtime and in the morning. In very obstinate cases the injection of an ounce or two of salt water into the rectum renders the action more intense, the fluid being retained until the stool is had. Its employment should be maintained for ten days or two weeks, and then gradually discontinued, the strictest attention being, of course, paid to regularity as to visiting the



water-closet. That the effect is due to the galvanic current is proved by purposely interposing a non-conducting cord while experimenting, and by substituting plates which do not produce a current. The patients, of course, under these circumstances, were not aware of the defect, and, therefore, the imagination had full play, and the mechanical irritation induced by distention of the sphincters was also active; yet the results was, in such experiments, uniformly negative. The current may be used in aural practice by dropping a little salt water into the meatus, and entering the negative rod a short distance therein, the positive being placed upon the tongue. In the earache of childhood this manœuvre has been followed by good results in a few cases in which it has been tried, but the main object is to overcome constipation, and this the miniature battery will assuredly do, with but little perseverance, small expense, and neither trouble nor medicine."

The lines in quotation are from the February 25th, 1882, number of the *Medical and Surgical Reporter*, a communication from Wm. R. D. Blackwood, M. D. (Physician to St. Mary's Hospital).

Anti-Constipator.....	\$4 00
With extra attachment for treatment of Neuralgia.....	5 00
Pliable Cord, brown and green, per pair.....	50
Couplings, brass, each.....	30
Binding Screws, ".....	08
Binding Posts—Wood Screw.....	18
" Office, single.....	18
" Instrument No. 1.....	18
" " No. 2.....	16
" " No. 3.....	15

Miscellaneous parts of any form of Galvanic or Faradic Batteries made to order at short notice.

Repairs made for any description of electrical mechanism at reasonable rates.

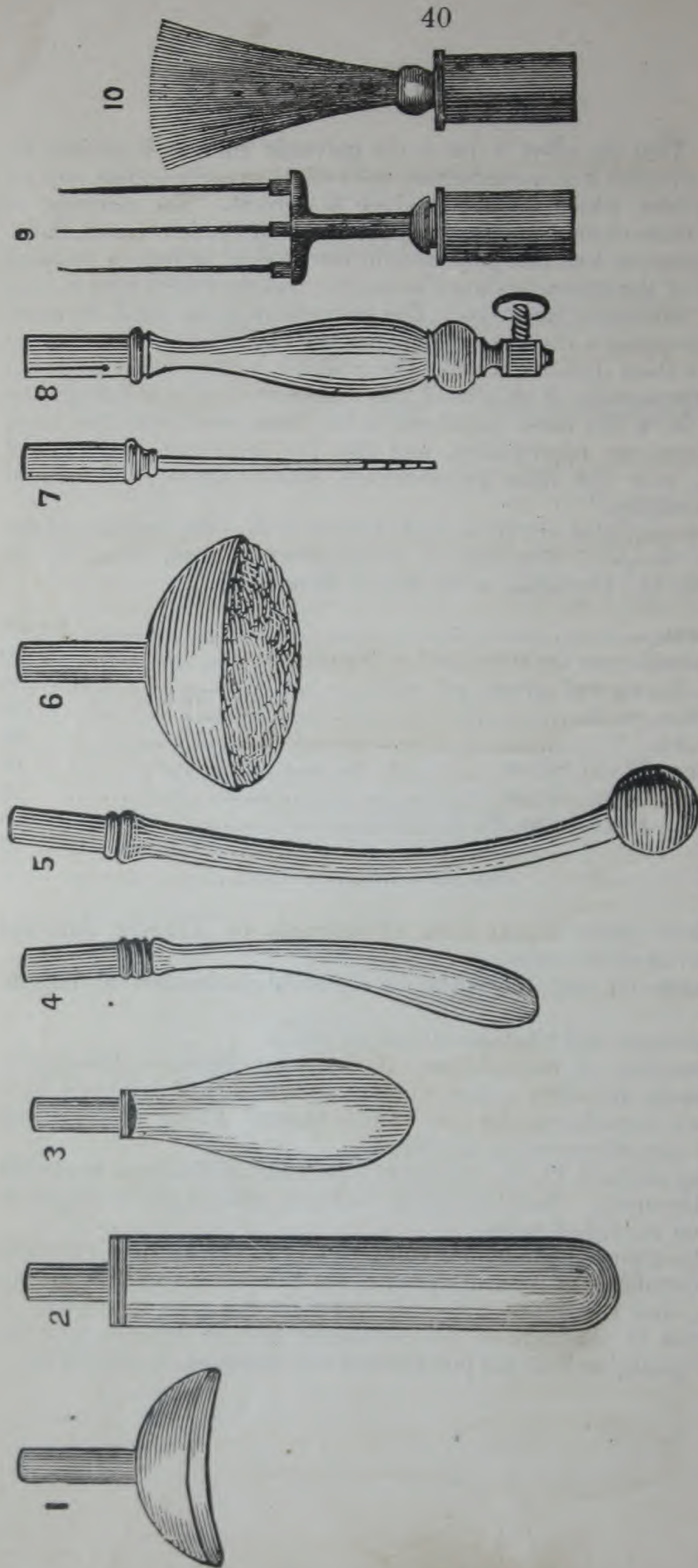
Zincs, Platinums, and Carbons always on hand.

A large number of Second-hand Batteries of Kidder's, Drescher's, Galvano-Faradic and other makes on hand and for sale at low rates, having been taken in exchange for our "Little Giant," Physician's Visiting Battery and our other electric machines.

In ordering goods C. O. D., twenty-five per cent. of the amount should accompany the order. Small mailable packages, such as platinum plates, mailed free on receipt of price.

Despite the claims made by our competitors concerning the Centennial Award, the Certificate of Award, signed by the Committee, hangs in a frame in our office, and the words, "the only award for this class of exhibit," is plainly printed in the body of the certificate, but we depend upon the merit of our goods, and do not put forward any claim we do not fulfill.





# DR. GLASS' UNIVERSAL HANDLE.

CONSISTING OF THE FOLLOWING NAMED DIRECTORS:

No. 1, Eye. No. 2, Vagina. No. 3, Tongue. No. 4, Rectum. No. 5, Womb. No. 6, Sponge. No. 7, Ear. No. 9, Gold Needles. No. 10, Silver Wire Brush. No. 8, Handle into which they all fit, a handsome walnut lined case. Price, \$12.

By this arrangement all the directors are fitted to one handle, and as only one of them is used at one time, they need only one insulated handle, which makes the whole set much cheaper than if each had a handle attached. They are Silver-plated, and fitted neatly in boxes. The directors should be covered with cotton-flannel, moistened with water when in use, as this will prevent that burning sensation so disagreeable to patients. In the eye-cups, tepid water must be used.







## TESTIMONIALS.

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We have a large number of voluntary testimonials in our possession which may be seen at any time. Those appended are only a sample, and show how our batteries stand in the estimation of eminent practicing physicians of various schools, as well as among those who are specialists.

LOS ANGELES, CALIFORNIA, April 8th, 1884.

DR. JAMES GLASS.

DEAR SIR:—I have used your batteries for the last ten years; I have twelve in my office, that I can treat twelve patients at one time. I have used most every manufacturer's make, but have discarded them all. They do not come up to yours in any way especially in strength, steadiness, and smoothness of current, those things that any electrician prizes. I gave six thousand treatments in 1883.

Yours truly,

C. S. HASTINGS, M. D.,

*Rooms 9, 10, 11, and 12, Post Office Block, Los Angeles, Cal.*

This, coming from a successful electrical specialist, is an especially valuable reference.

LAS CRUCES, NEW MEXICO, April 9th, 1884.

DR. JAMES GLASS.

DEAR SIR:— \* \* \* \* \* The Physician's Visiting Battery is all you claim for it, and more. I am thoroughly satisfied with it and think it an indispensable article of the busy practitioner's armamentaria. No matter how many larger office batteries the physician may possess, the Physician's Visiting Battery will fill a want which the others cannot; this by its compactness, small size, light weight, and powerful volume. I have had perfect success in the use of my battery.  
\* \* \*

Your obt. servant,

J. P. BOOTH, M. D.

Dr. Booth is Physician to the Visitation Academy of Las Cruces and contributor to many of our Eastern medical publications.

PLEASANTVILLE, OHIO, March 13th, 1884.

DR. JAMES GLASS.

DEAR SIR:— \* \* \* \* \* The Physician's Visiting Battery I have found just as you said. \* \* \* \* \* I can't say enough in behalf of your make of batteries.

J. B. WILLIAMS, M. D.

Dr. Williams had been using one of our Batteries for eight years previous to receiving the Physician's Visiting Batteries.

PHILADELPHIA, June 3d, 1879.

I have used Electro-Magnetic Apparatus made by Dr. James Glass, of Philadelphia, and have always been entirely satisfied with their mechanism and power.

M. MACFARLAN, M. D.,

*1805 Chestnut Street.*



PHILADELPHIA, May 20th, 1879.

DEAR SIR:—I am glad to say that your Battery has fully answered all demands made upon it during six months, in which time it has been kept very busy. It has not required any adjustment or repair, excepting the necessary renewal of the battery solution; and although several other Faradic machines are in my possession, all of them from good makers I have employed the "Little Giant" only. For professional use, no other apparatus surpasses the "Little Giant" or your "French" battery. The currents are even, smooth, pleasant and easily graduated to any required strength. Although there are many good Batteries to be had, most of them are unnecessarily expensive and difficult to keep in order.

Very truly,

WM. R. D. BLACKWOOD, M. D.,  
246 North Twentieth Street.

We give the following letter from Brevet Colonel H. E. Goodman, U. S. Vols., Surgeon to Wills' Eye Hospital and the Orthopædic Hospital and Infirmary for Nervous Diseases:

1427 CHESTNUT STREET,  
PHILADELPHIA, June 6th, 1879.

DR. JAMES GLASS.

DEAR SIR:—Having used your various Galvanic Batteries for upward of twelve years, I am pleased to commend your ingenuity in producing such an admirable one as the latest, which you call your "French Battery."

Truly yours,

H. EARNEST GOODMAN.

S. E. CORNER SEVENTEENTH AND WALNUT STREETS,  
PHILADELPHIA, June 6th, 1879.

DR. JAMES GLASS.

DEAR SIR:—During the past ten years I have used your Batteries, and have resorted to the galvanic and magneto-electricity frequently and under a variety of circumstances, and ascribe to your contrivances for developing its different effects a considerable share of the satisfactory results I have realized from this potent remedial agent.

Very respectfully,

CALEB W. HORNOR, M. D.

1733 CHESTNUT STREET,  
PHILADELPHIA, June, 1879.

From my knowledge of the Battery manufactured by DR. JAMES GLASS, I can recommend it as an instrument admirably adapted to all the wants of the general practitioner.

A. R. THOMAS, M. D.

#### TESTIMONIALS REGARDING TREATMENT.

We could fill a book with testimonials regarding treatment. There are many who, from the nature of their complaint, would not care to have it appear in print, while others who are perfectly willing to give personal reference have an objection to having their names published, but from those who do not object to their names being published we select a few in order to show the different diseases controlled by electricity.



SPRINGFIELD, DEL. CO., PENNA., March 17th, 1884.

DR. JAMES GLASS.

DEAR SIR :—I received a note from you in regard to reference to the manner you have treated me for rheumatism. Sir, you can use the best words that reference can give on my behalf and it will substantiate that there is nothing equal to it. Make words to suit yourself and it will be all right.

Yours truly,

J. M. WORRELL.

As Mr. Worrell's first treatment was given over six years ago, he has had time to know. Instead of following his permission and wording it to suit ourselves, we give it as he wrote it.

RED LION P. O., NEW CASTLE CO., DELAWARE, March 17th, 1884.

DR. J. GLASS.

SIR :—This is certifying that about thirteen years ago I was very low with pleuro-pneumonia and DR. J. GLASS was called in and administered electricity, and it cured me. Also, about a year previous he cured me of cancer of the nose, and I have been well ever since. For further information call on me.

ANTON TERHOVEN.

This old gentleman is a German (over eighty years of age), which shows in the construction of his letter. In fourteen years he should have known whether every cancer germ had been eradicated or not. In the case of the pneumonia, his friends we found gathered around his bed to see him die, as no hope of his recovery was entertained. After he was able to be about, before he had entirely recovered, by careless exposure, he had a relapse which took fifteen treatments to overcome.

PARRY, BURLINGTON CO., N. J. March 22d, 1884.

DR. J. GLASS.

ESTEEMED FRIEND :—I have taken two of DR. GLASS' treatments for paralysis with beneficial result.

Respectfully,

WILLIAM PARRY.

*Parry, New Jersey.*

This worthy and conscientious "Friend" was cured of paralysis of the right side with two galvanic treatments. From either the peculiar methods of expression of his class, or a want of appreciation of the difficult nature of his trouble, he is quite brief in his statement. He is the proprietor of the renowned Pomona Nurseries, and has the same reputation for honesty and conscientiousness in his large business that he manifests in all his other relations.

PHILADELPHIA, PA., March 28th, 1884.

DR. J. GLASS.

DEAR SIR :—Six years ago you treated me with electricity for hemorrhage of the lungs, when the doctors acknowledged they could give me no hope. Electricity saved my life when I believe nothing else could, and I think I should know by this time whether I am cured.

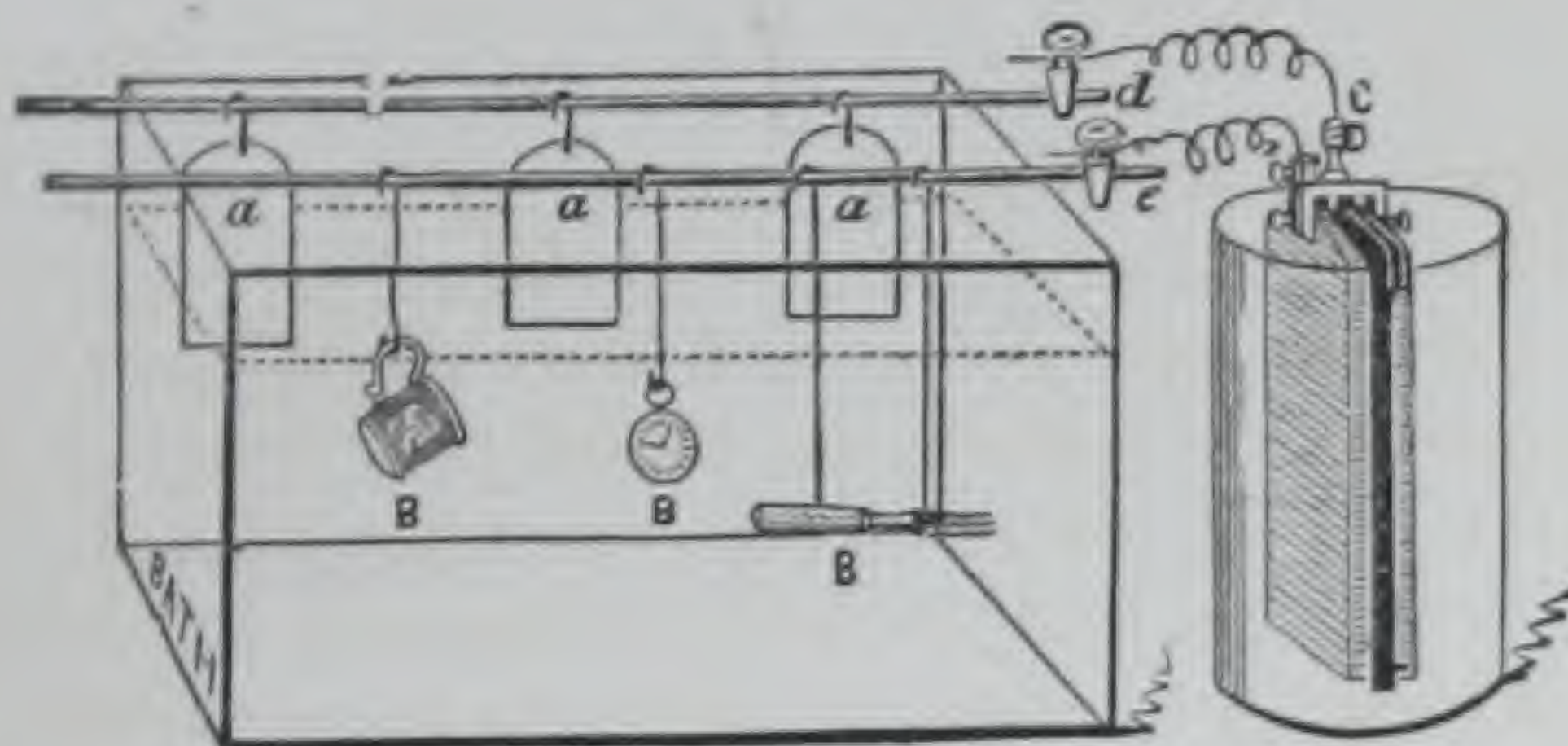
MRS. MELLON,

*817 Dickerson St. below Memphis, Kensington, Phila., Pa.*



This speaks for itself: "John Haag, of John Jamison & Co., 402, 404, 406, 408, 410, 412 Farmers' Market, wholesale produce dealer: This gentleman and his family has for eight years used no other than electropathic treatment. Mrs. Haag was dying with consumption eight years ago and is to-day the picture of health."

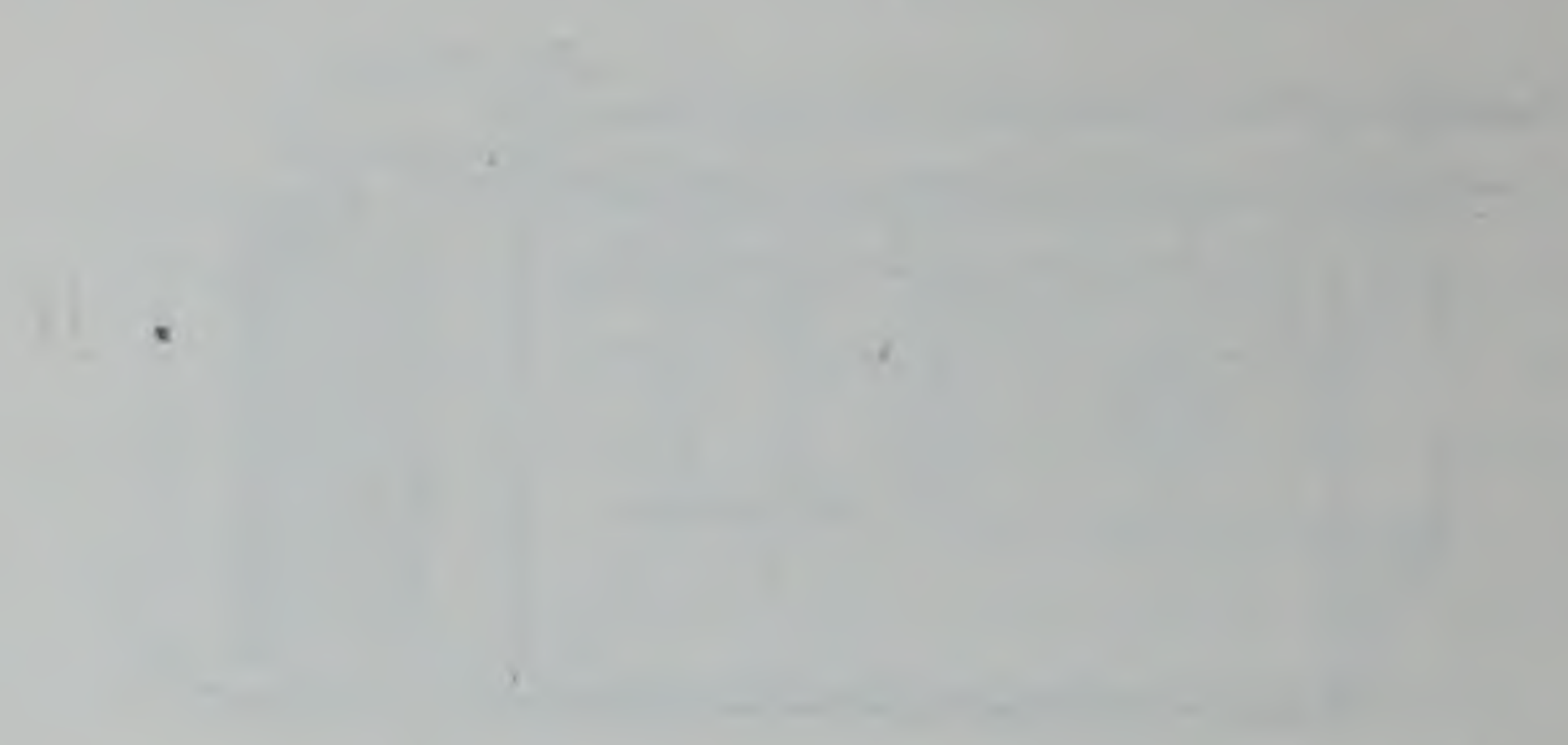
Captain Peter N. Cruse, 712 South Second, Philadelphia, Pa.; Jos. H. Hoops, Storm Lake, Iowa; R. A. McClure, U. S. Mint, Philadelphia, Pa.; G. G. Lobdell, Car Wheel Mfr., Wilmington, Del.; ex-Sheriff Garrison, Gloucester Co., N. J.; A. M. Gillette, of Woodman & Co., Thirteenth and Market Streets, Philadelphia, Pa.; H. M. Beidler, ex-Mayor of Texarkana, Arkansas: cured of chronic enlargement of the liver. From a list of cures made during eighteen years of practice, I find almost every disease that humanity is afflicted with, including blindness and deafness, and can refer to cases where (until experience had changed our opinion) we judged no treatment would be of any avail.



Silver-plating Apparatus complete.....\$8 00



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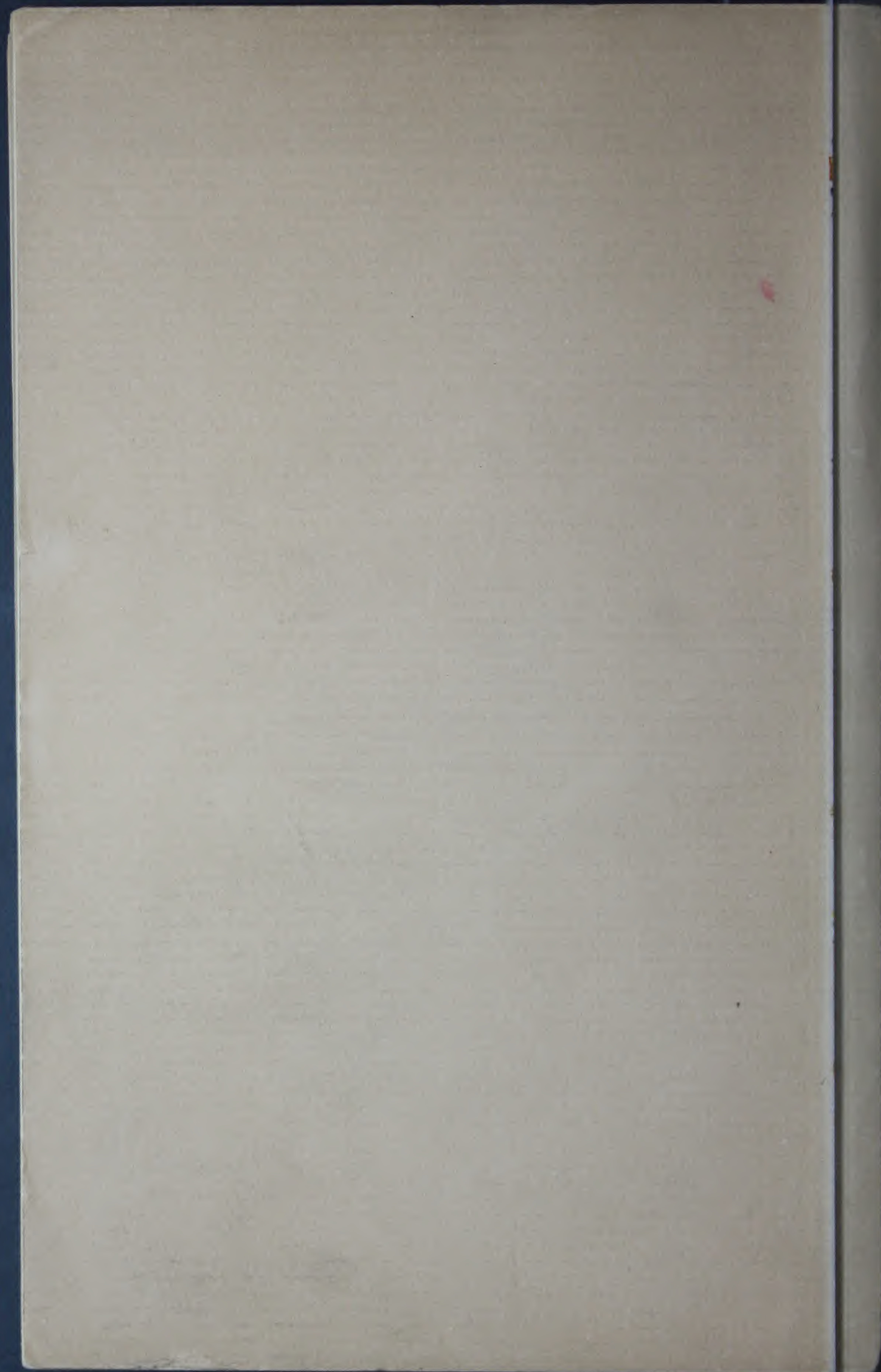














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